

161

Field Test in Santa Cruz
Volume 2
Figures

Cook Salomonson

SSAB

A-215.7-

FIELD TEST OF THE LINS METHOD FOR THE RECOVERY OF OIL FROM TAR SAND

Volume 2

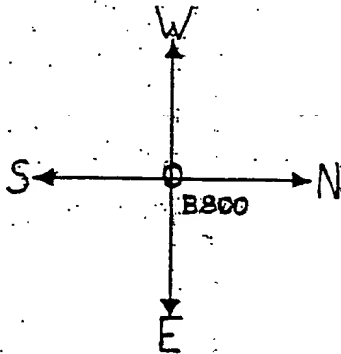
Figures

SANTA CRUZ, CALIFORNIA

Figure 1

L0-213
DEC. 20. 1957. 8P

TAR CONTENTS



HOLE POSITION IN FT FROM B800 IN L8.
SCALE: 1" = 50'.
TAR CONTENTS IN % BY WEIGHT OF DRY
TARSAND FROM 10-15 FT, 15-40 FT AND
40-45 FT, WRITTEN ABOVE THE HOLE
POSITION.

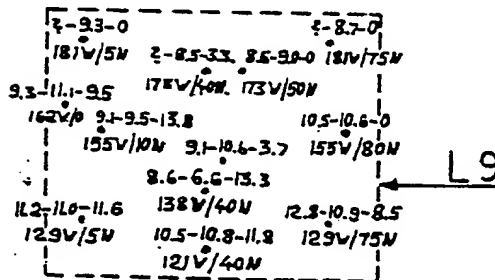
2.4-5.0-7.4
300V/200N

12.1-6.4-7.2
262V/0

9.5-7.4-12.2
190V/50S

5.0-8.5-2
200V/200N

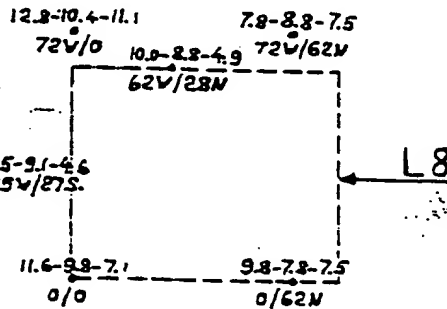
11.3-10.1-12.5
130V/55S



7.4-9.9-0
100V/200N

L6
12.6-8.3-6.6
14V/95S

L7
9.4-7.7-4.0
25V/31S



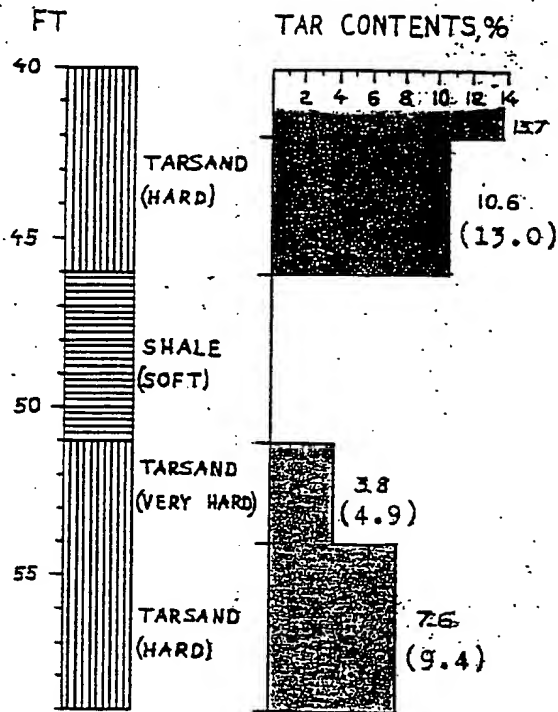
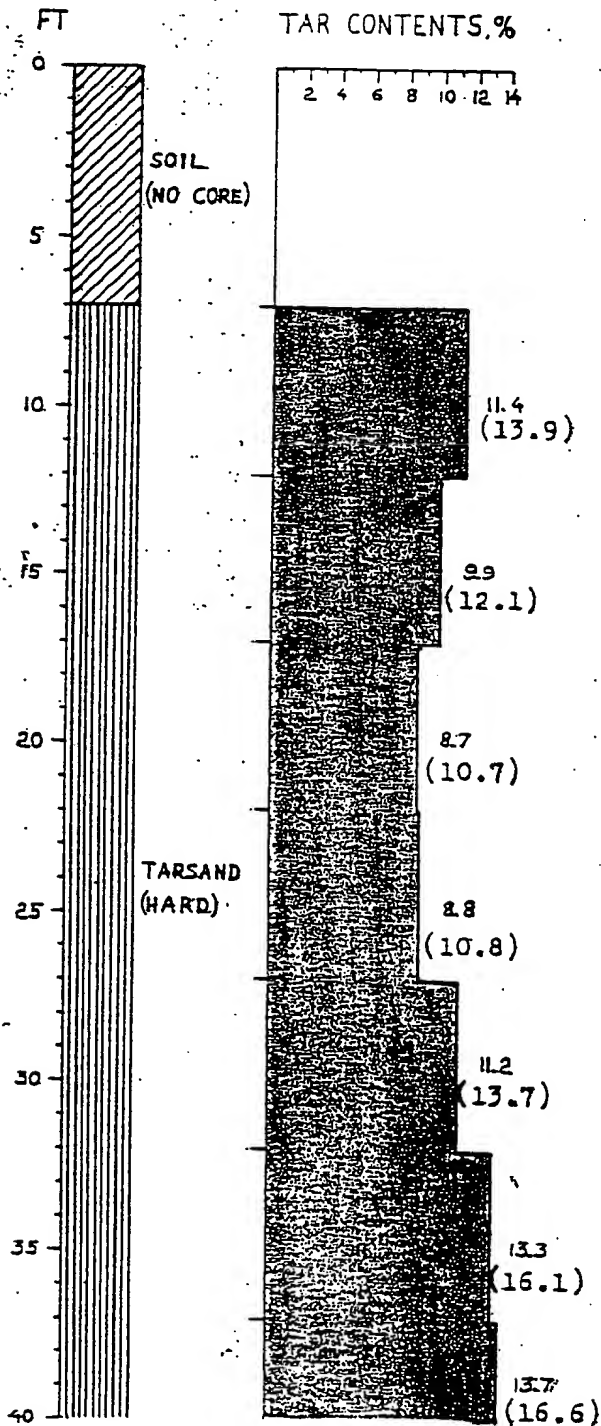
2-7.6-2.6
0/200N

Figure 2

L9-200
AUG. 30. 1957. 88

WELL LOG

121 W / 40 N. (B2-5)

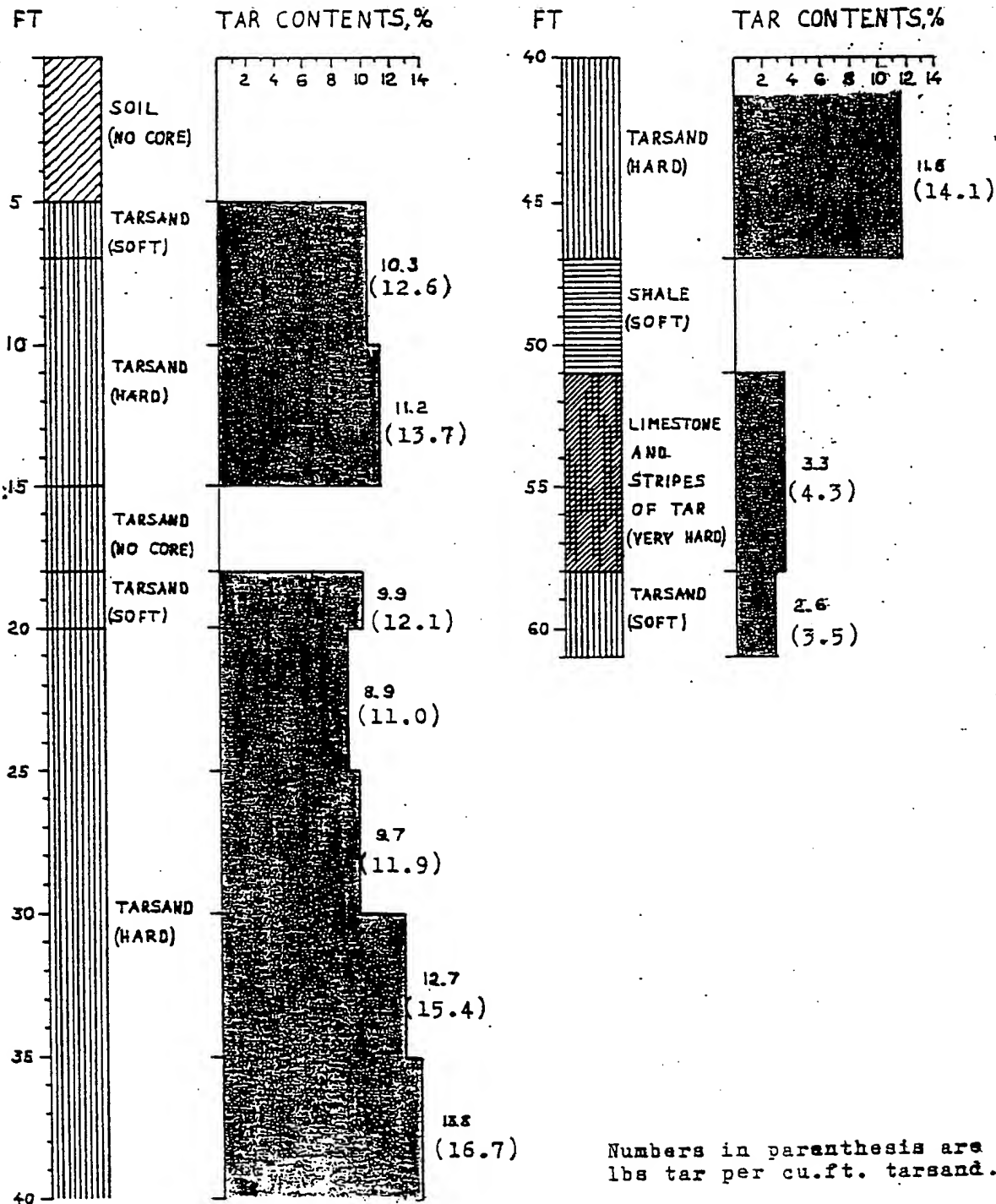


(Numbers in parenthesis are lbs tar per cu.ft. tarsand.)

Figure 3

L9-201
AUG. 30. 1957. 8P

WELL LOG
129 W/5 N. (B3-2)

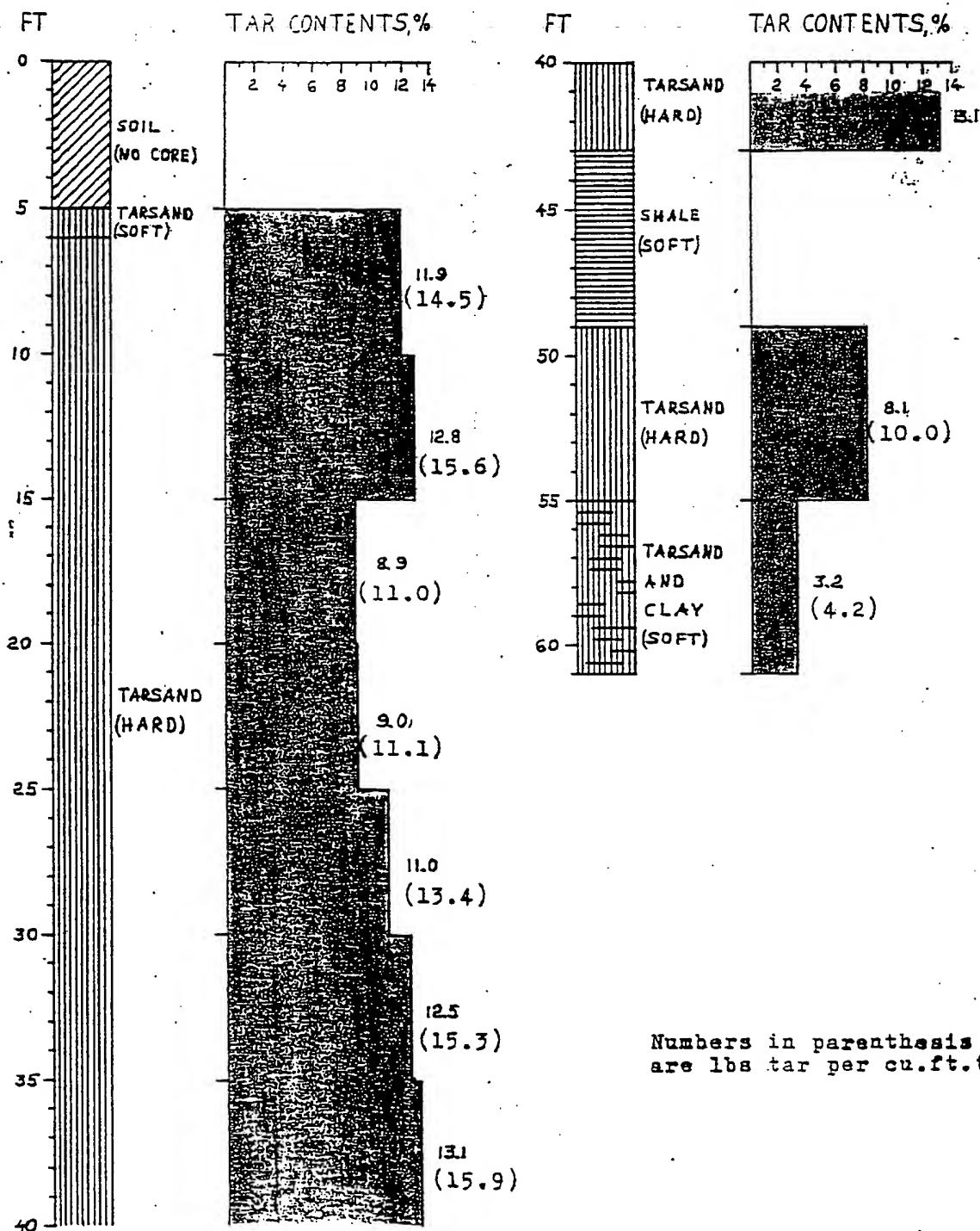


Numbers in parenthesis are
lbs tar per cu.ft. tarsand.

L9-202.
AUG.30.1957. 88

Figure 4

WELL LOG 129 W/75 N. (B3-9)



Numbers in parenthesis
are lbs tar per cu.ft. tarsand.

L9-203.
AUG.30.1957.89

Figure 5

WELL LOG

138 W/40 N. (B4-5)

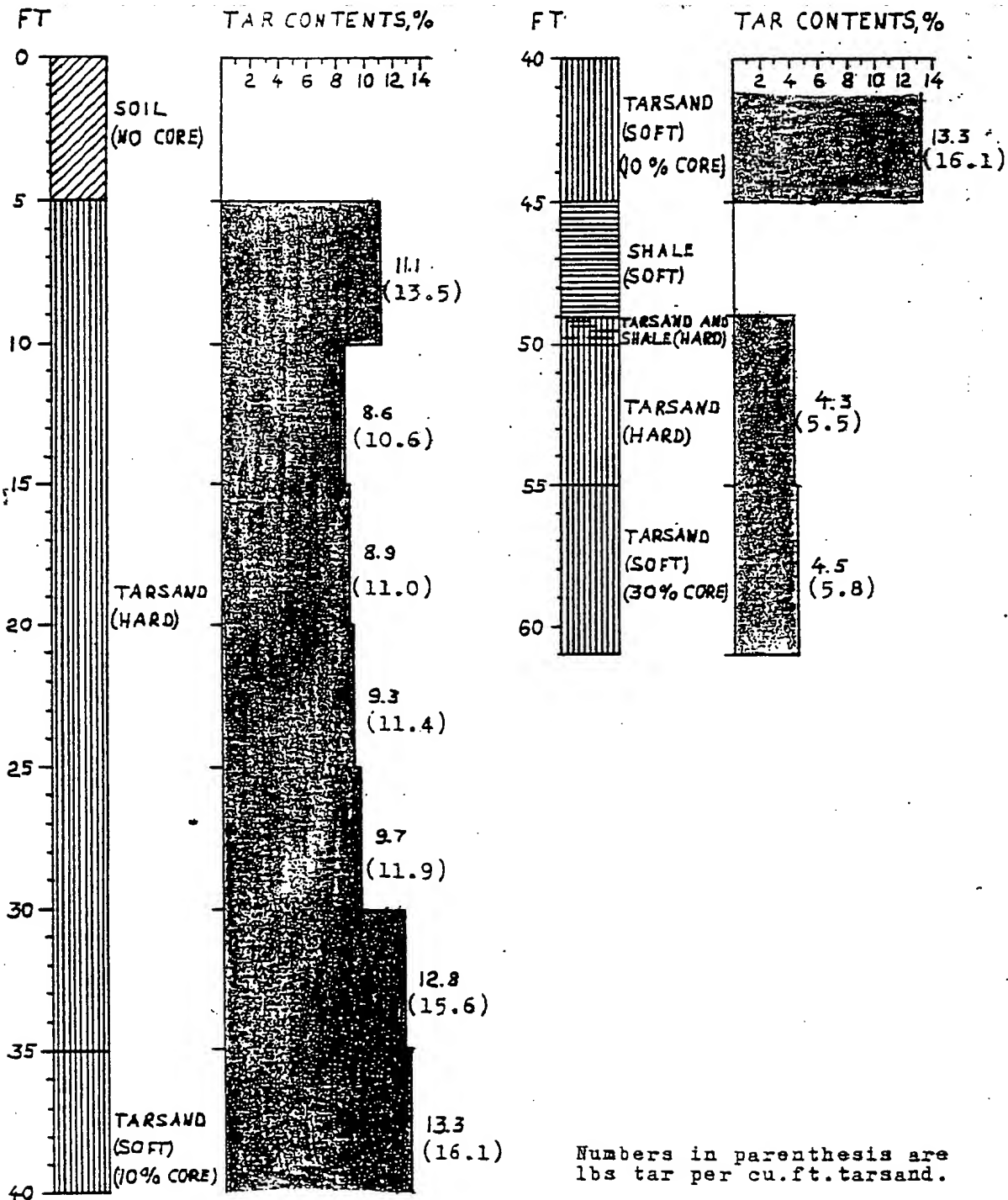
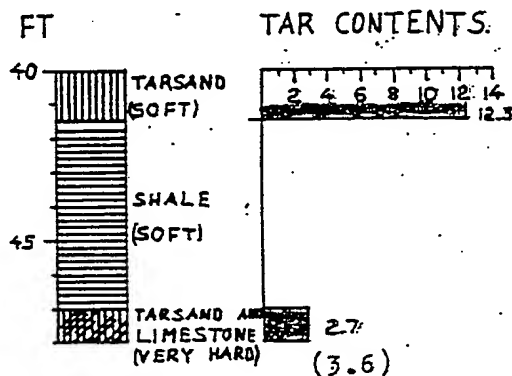
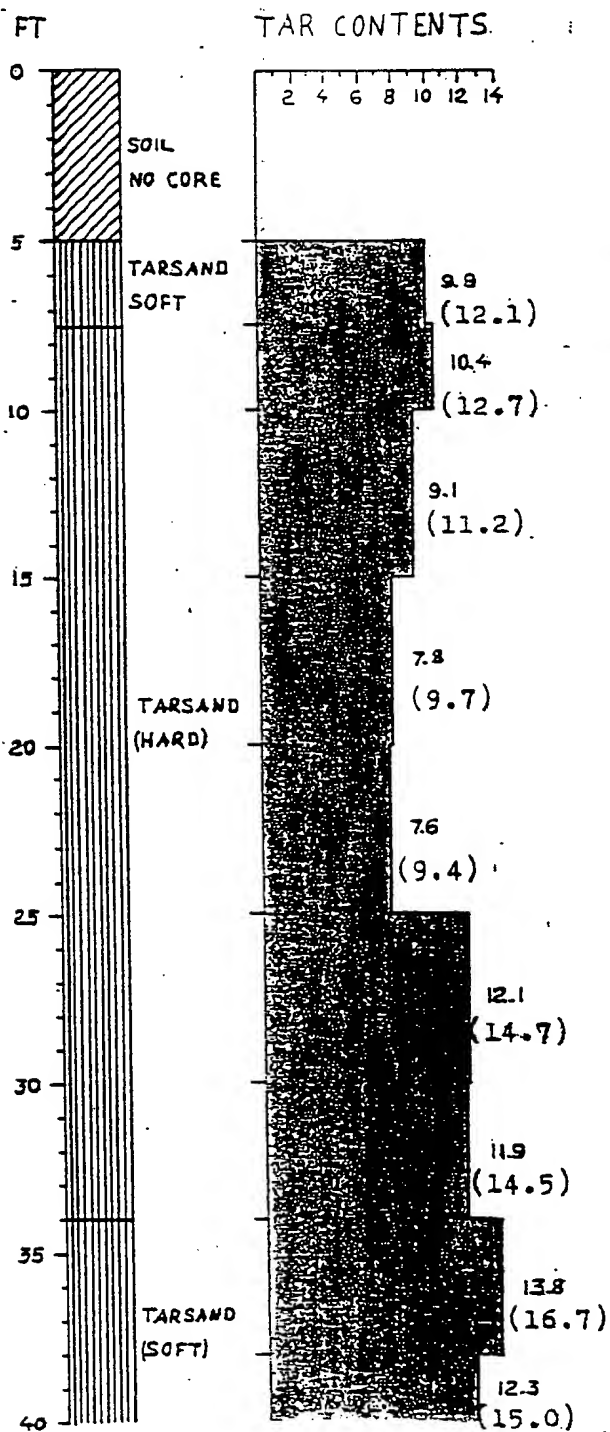


Figure 6

L9-212
OCT 18 1957 88

WELL LOG
147 W/45 N. (B5-6)



Numbers in parenthesis are
lbs tar per cu.ft. tarsand.

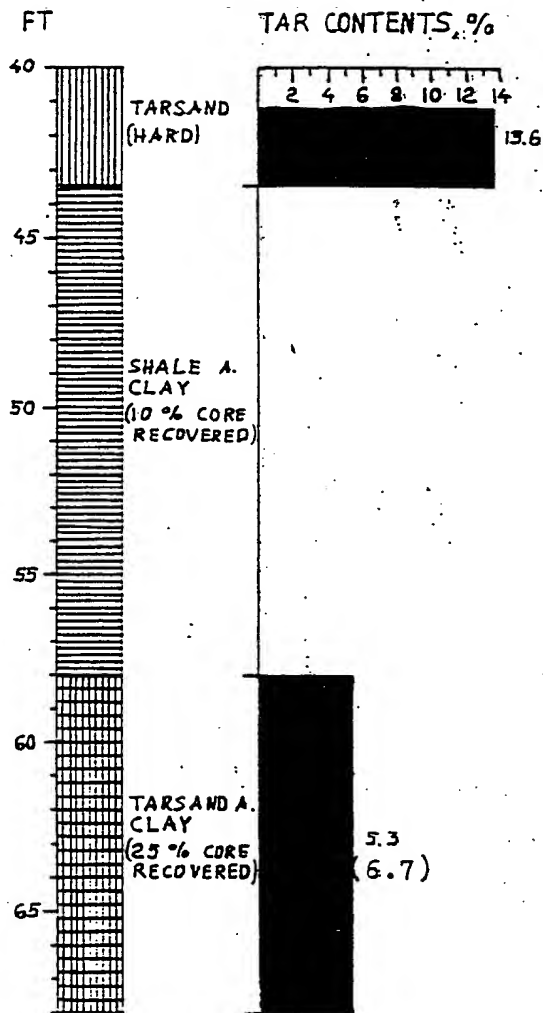
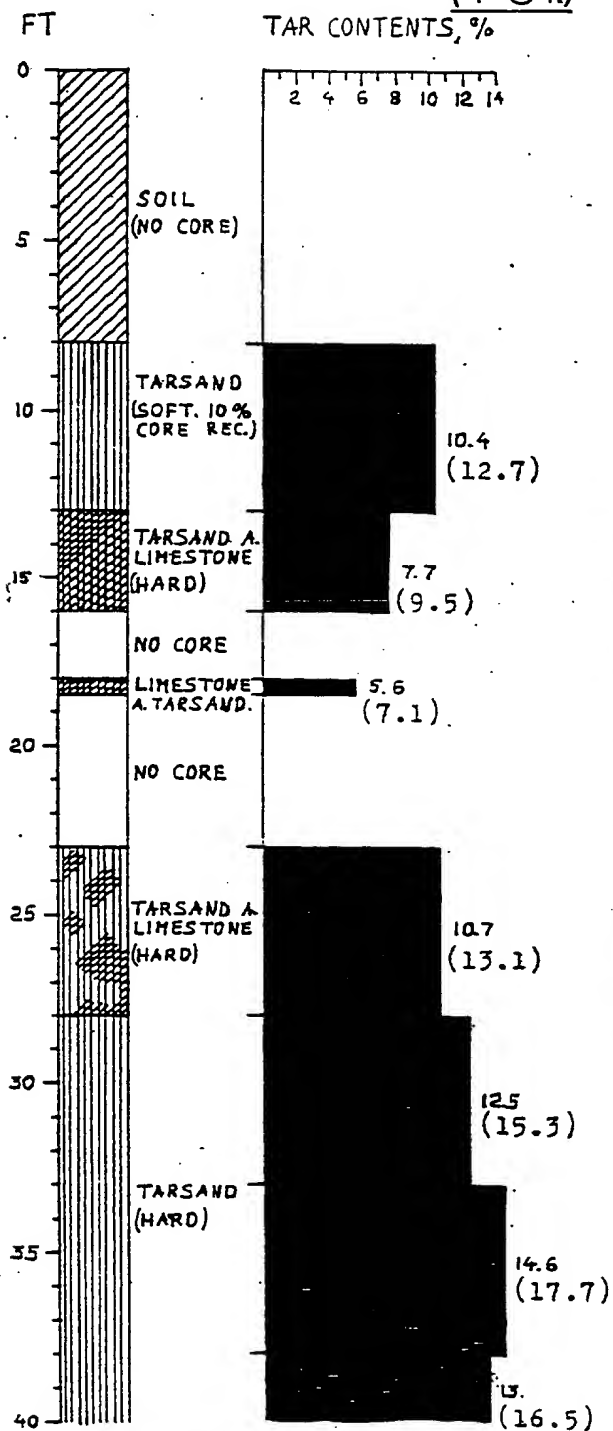
Figure 7

L9-204
1957.MAY 2. 80

WELL LOG.

162W/O.

(T61.)

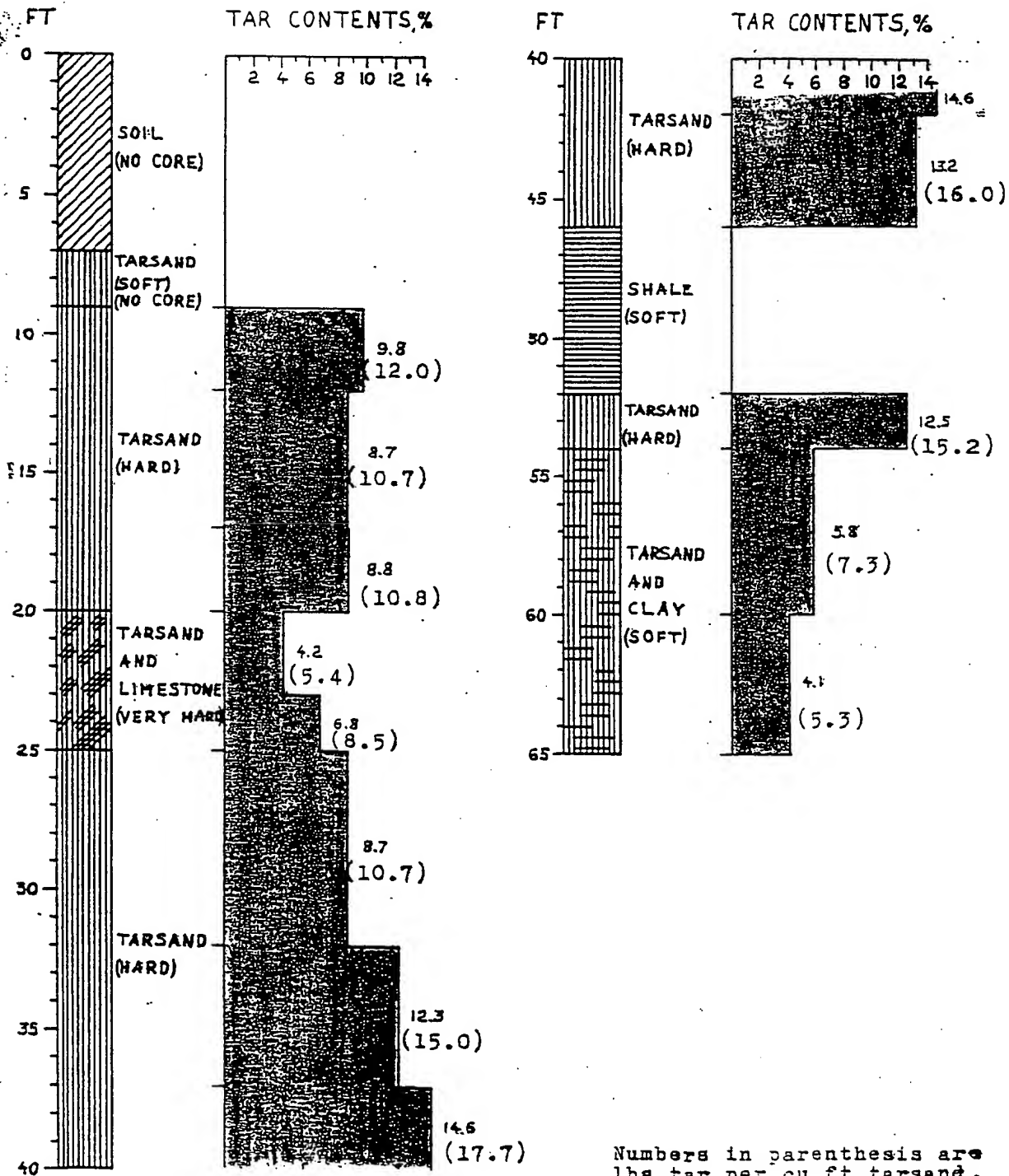


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

Figure 8

L9-205
OCT. 18. 1957. 82

WELL LOG
155 W/10 N. (B6-2.)



Numbers in parenthesis are
lbs tar per cu.ft. tarsand.

Figure 9

L9-206.
AUG. 30. 1957. 88.

WELL LOG.
155 W/80 N. (B6-9.)

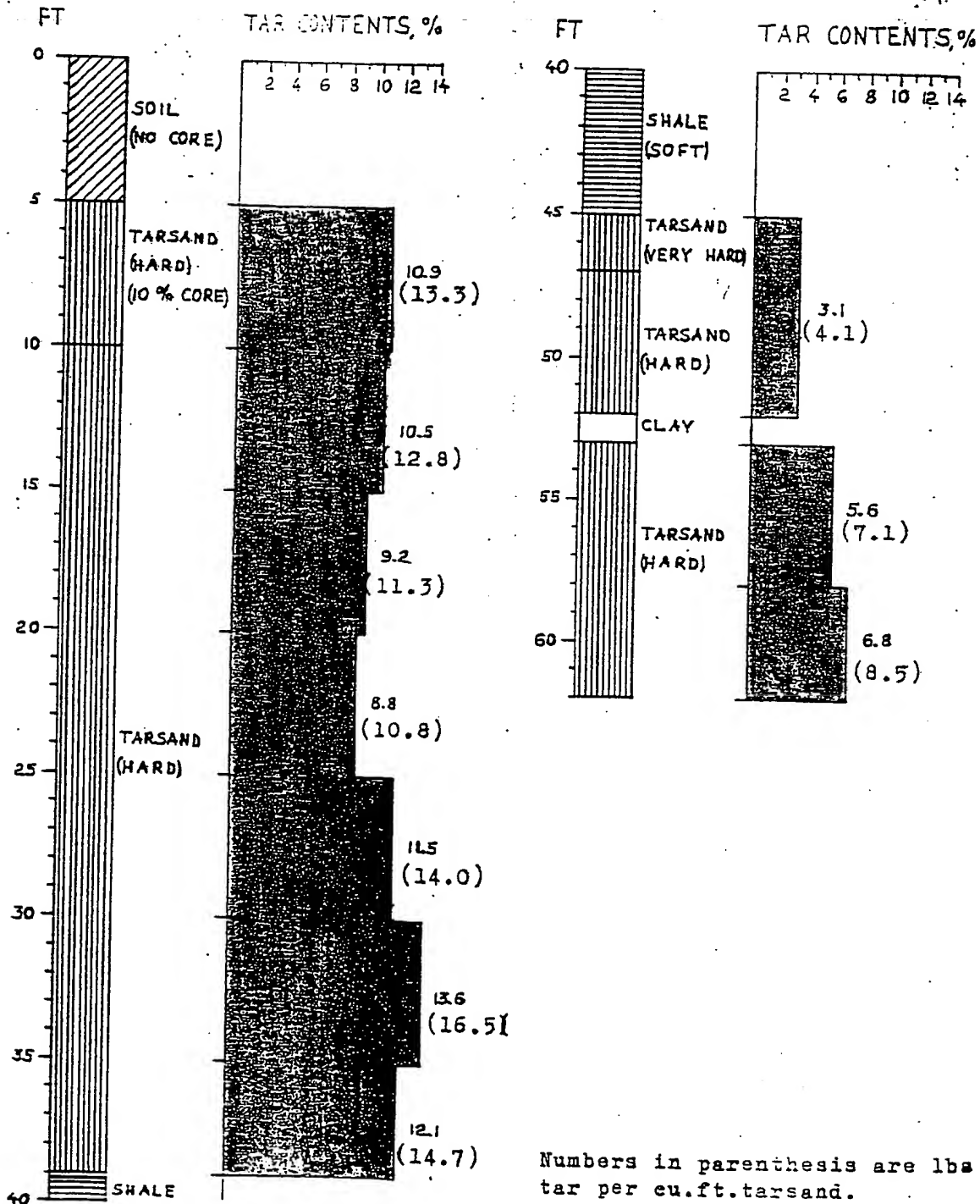
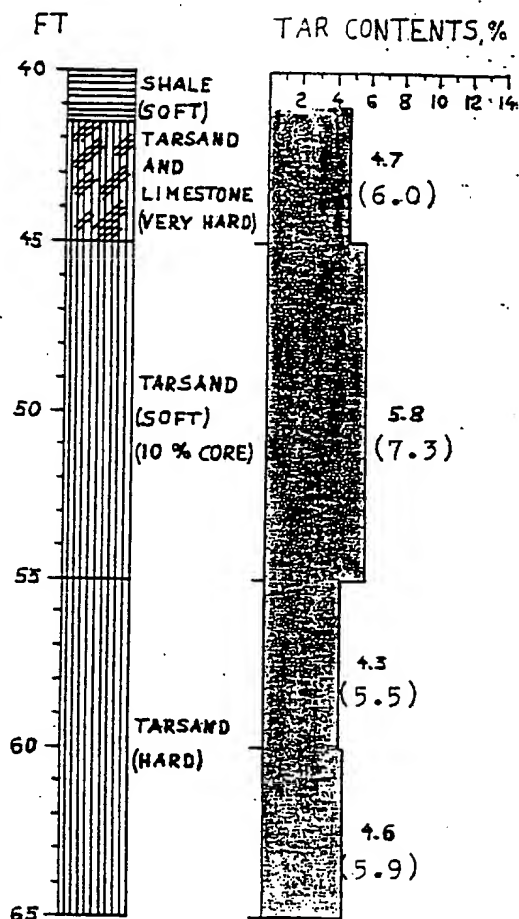
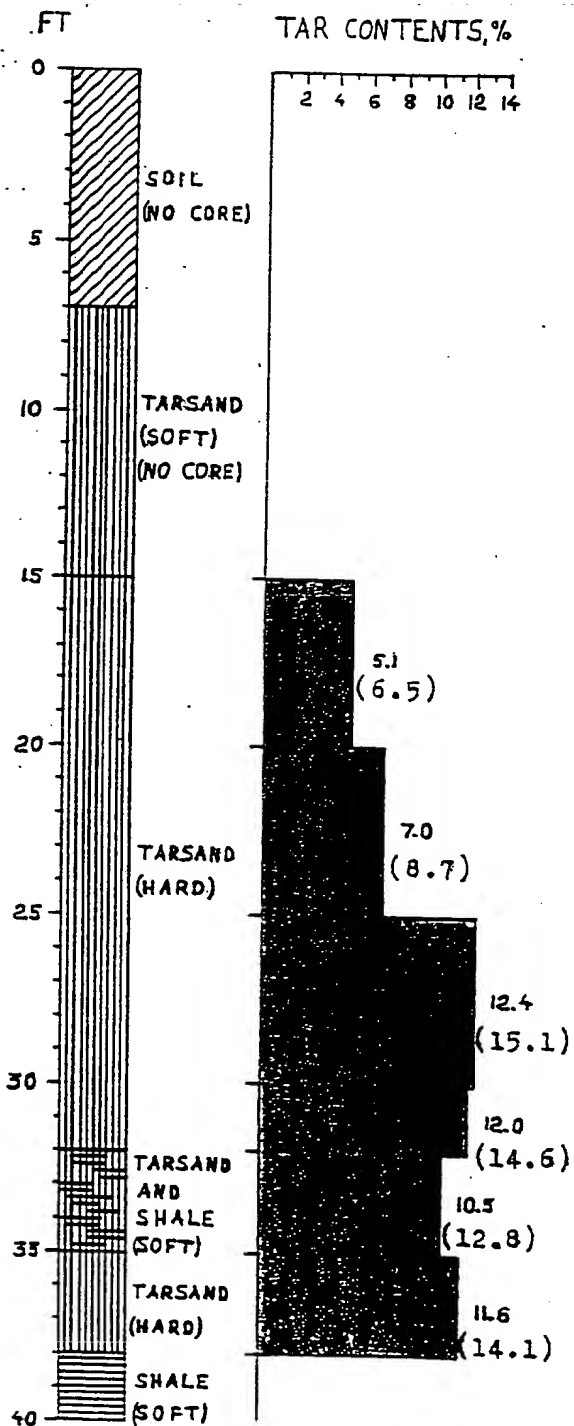


Figure 10

L9-207.
AUG. 30. 1957. 28.

WELL LOG.
173 W/40 N. (B8-5)

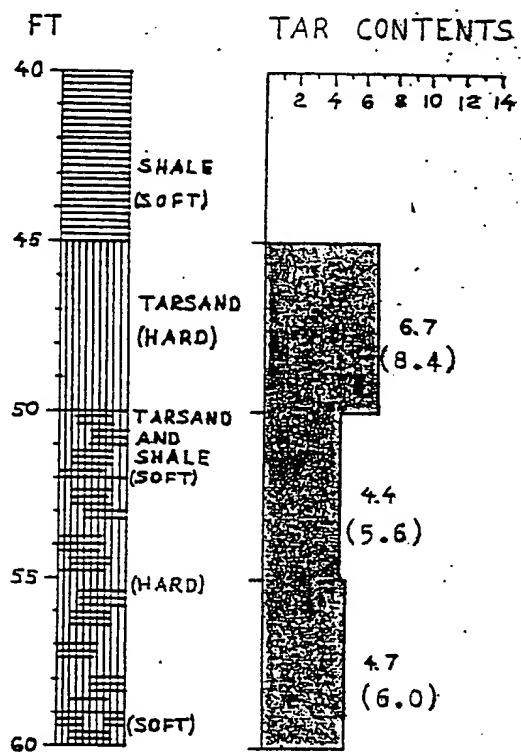
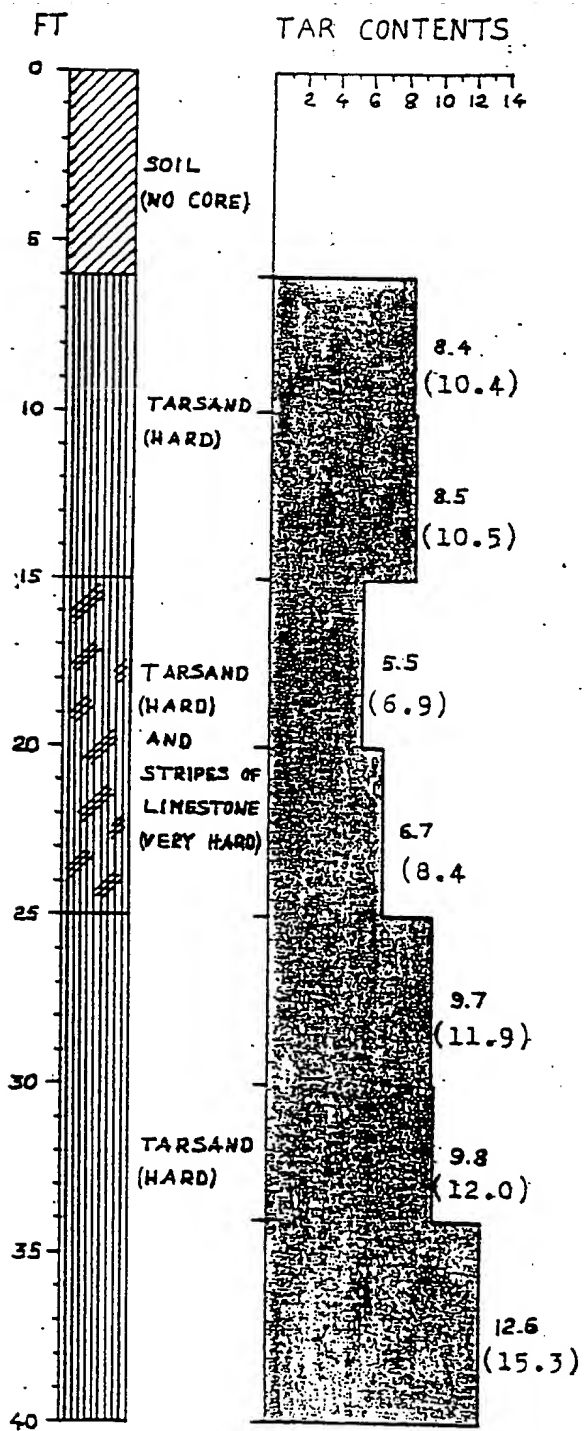


Numbers in parenthesis are lbs tar per cu. ft. tarsand.

Figure 11

L 9-211.
OCT. 18. 1957. 22.

WELL LOG.
173 W/50 N. (B8-6)

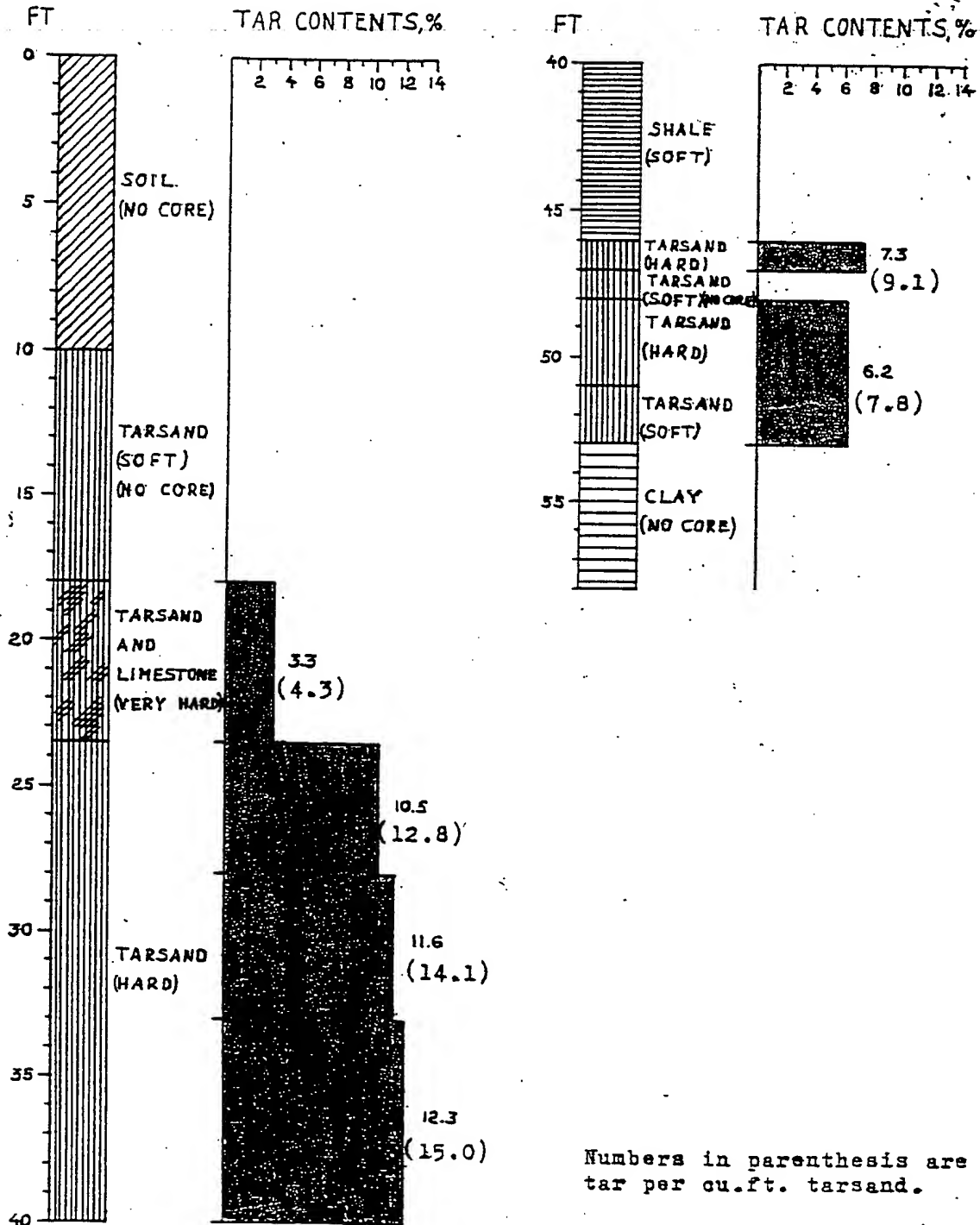


Numbers in parenthesis are lbs tar per cu.ft. tarsand.

Figure 12

L 9-208.
OCT. 18. 1957. 8P

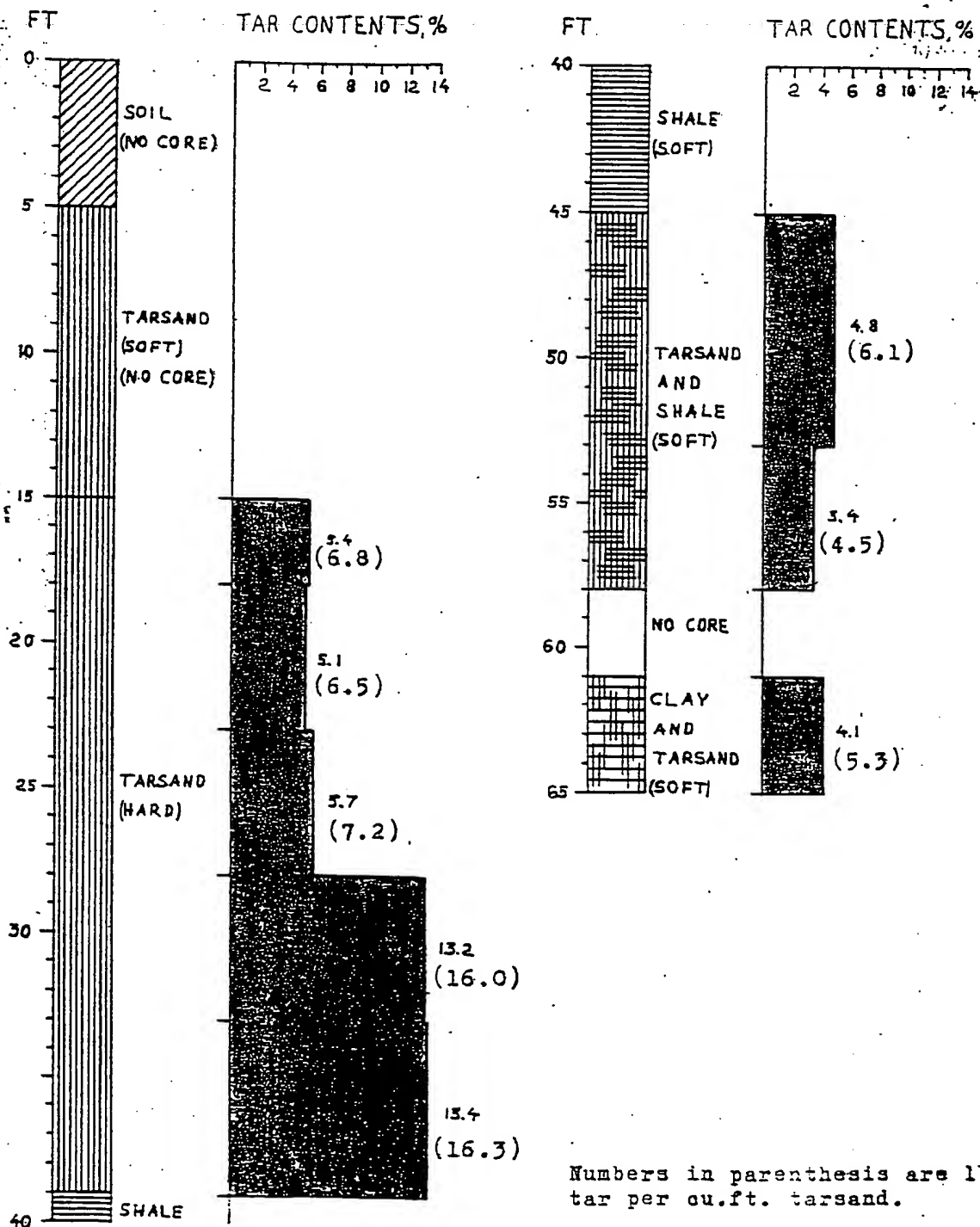
WELL LOG.
181 W/ 5 N. (B9-2)

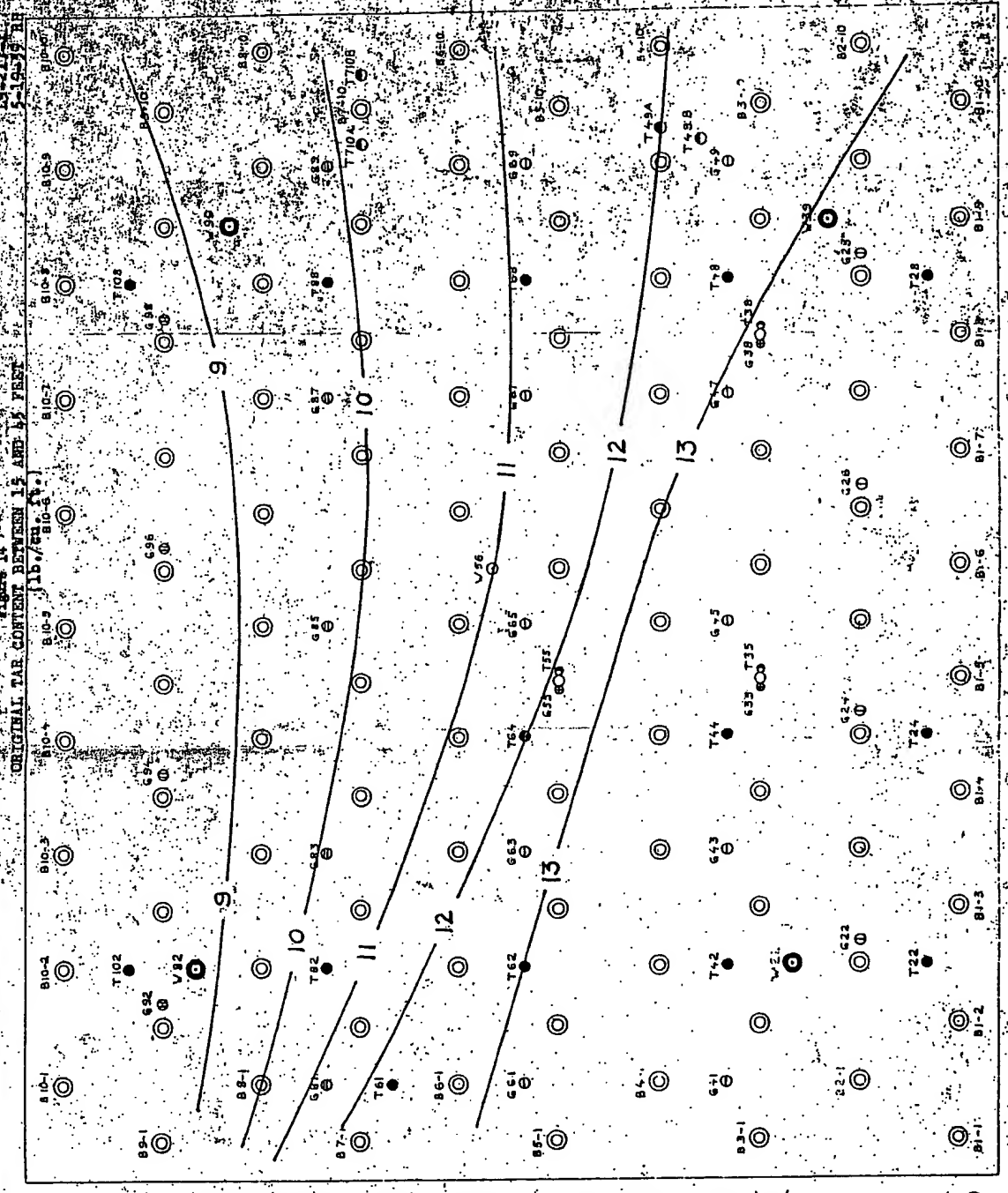


L9-209
OCT. 18. 1957. 88

Figure 13

WELL LOG
181 W/75 N. (B9-9)



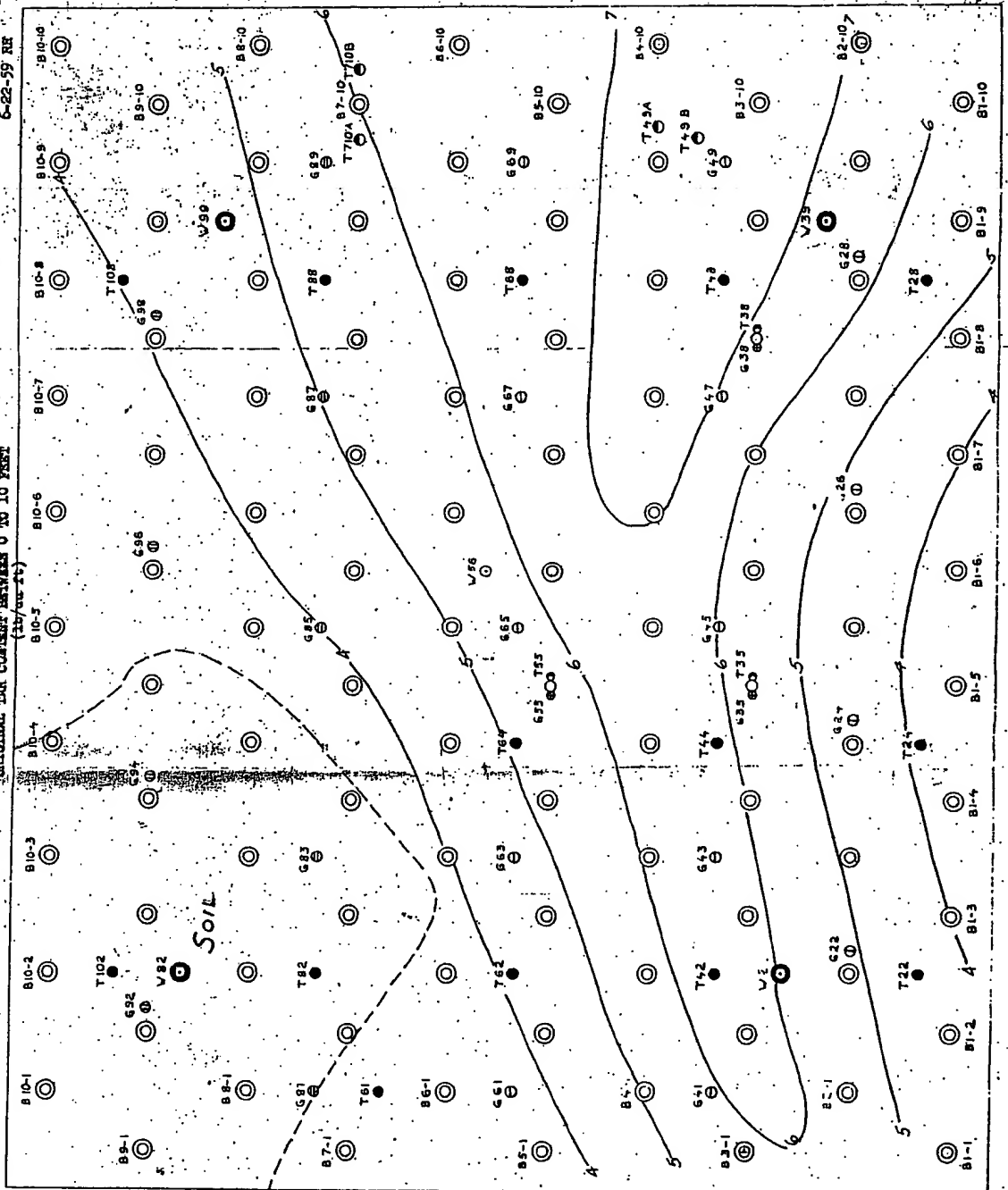


TEMPERATURE WELL 3" FROM ADJACENT BURNER, 55' 3/4" HOLE, 52' 2" CASING
 IN BURNER HOLE, 52' 1" CASING
 3" (T49B 4") FROM ADJACENT BURNER, 55' 3/4" HOLE, 52' 2" CASING

Figure 11
 ORIGINAL PAR CONTENT BETWEEN 15 AND 45 FEET
 15-37 15-38 15-39 15-40 15-41 15-42 15-43 15-44 15-45 15-46 15-47 15-48 15-49 15-50 15-51 15-52 15-53 15-54 15-55 15-56 15-57 15-58 15-59 15-60 15-61 15-62 15-63 15-64 15-65 15-66 15-67 15-68 15-69 15-70 15-71 15-72 15-73 15-74 15-75 15-76 15-77 15-78 15-79 15-80 15-81 15-82 15-83 15-84 15-85 15-86 15-87 15-88 15-89 15-90 15-91 15-92 15-93 15-94 15-95 15-96 15-97 15-98 15-99 15-100

13-217-6
6-22-59 RE

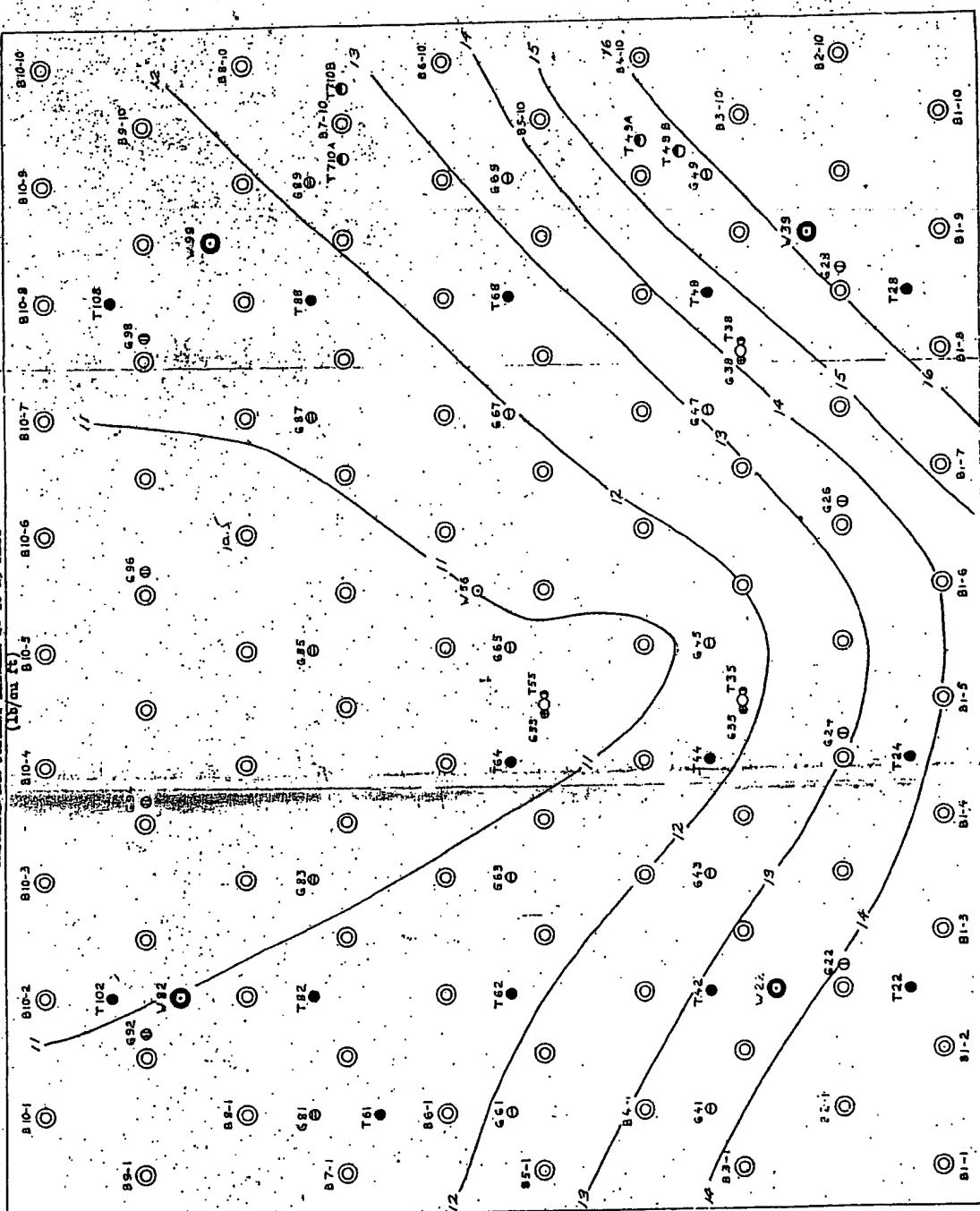
ORIGINAL TAR CONTENT BETWEEN 0 TO 10 FEET
(20/100 TV)



TEMPERATURE VELL, 5'9" FROM ADJACENT BURNER, 55.33% HOLE, 52.2" CASING.
IN BURNER HOLE, 52.1" CASING.
, 3' (T49B 4') FROM ADJACENT BURNER, 55.33% HOLE, 52.2" CASING.

10-217-3
6-22-59 RL

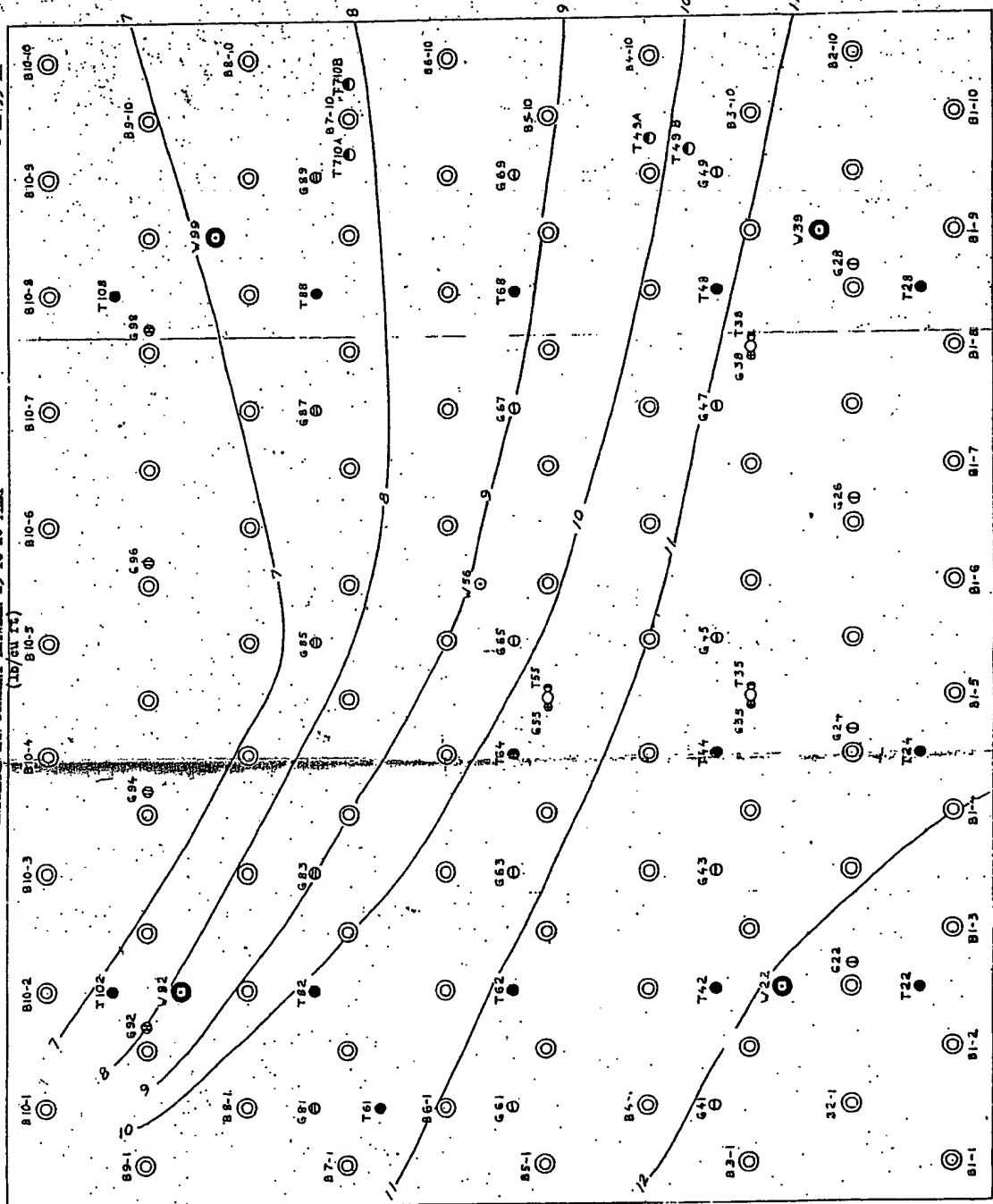
Figure 16
ORIGINAL AIR CONTENT BETWEEN 10 TO 15 FEET
(15/20 IN)



TEMPERATURE WELL 5.9" FROM ADJACENT BURNER, 55' 3 3/4" HOLE, 52' 2" CASING.
IN BURNER HOLE, 52' 1" CASING.
3" (1498.4) FROM ADJACENT BURNER, 55' 3 3/4" HOLE, 52' 2" CASING.

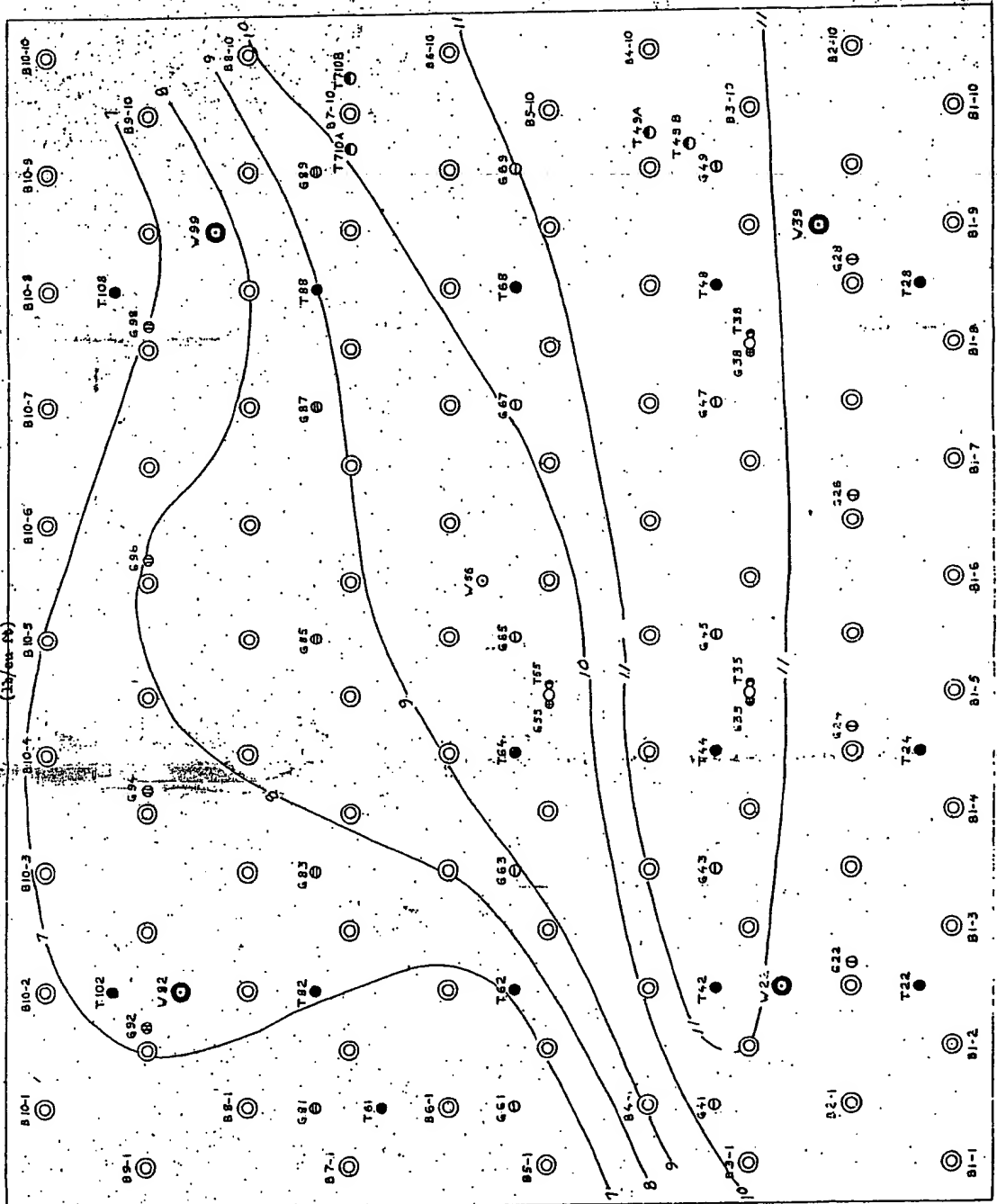
19-217-4
6-22-59 RH

Figure 17
ORIGINAL TAR CONTENT BETWEEN 15 TO 20 FEET
(15/20 TS)



● TEMPERATURE WELL 5'9" FROM ADJACENT BURNER. 55.3% HOLE. 52.2" CASING.
● IN BURNER HOLE. 52.1" CASING.
● 3' (T49B 4') FROM ADJACENT BURNER. 55.3% HOLE. 52.2" CASING.

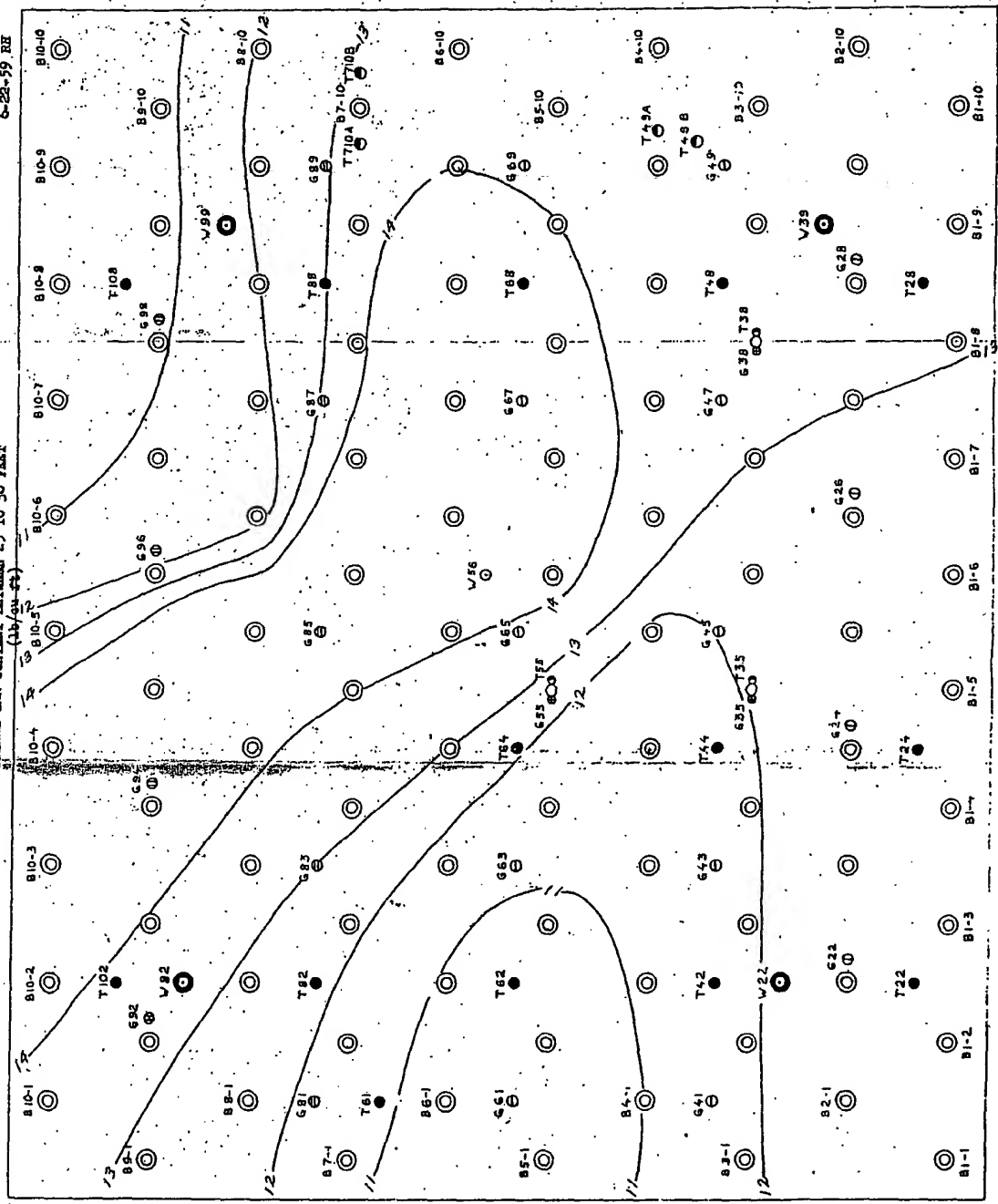
Figure 18
ORIGINAL TAR CONTENT BETWEEN 20 TO 25 FEET
(43-2845)



TEMPERATURE WELL .59' FROM ADJACENT BURNER .55-3¾" HOLE .52' CASING.
IN BURNER HOLE .52' CASING.
.3' (T9B 4') FROM ADJACENT BURNER .55-3¾" HOLE .52' CASING.

19-217-6
6-22-59 RE

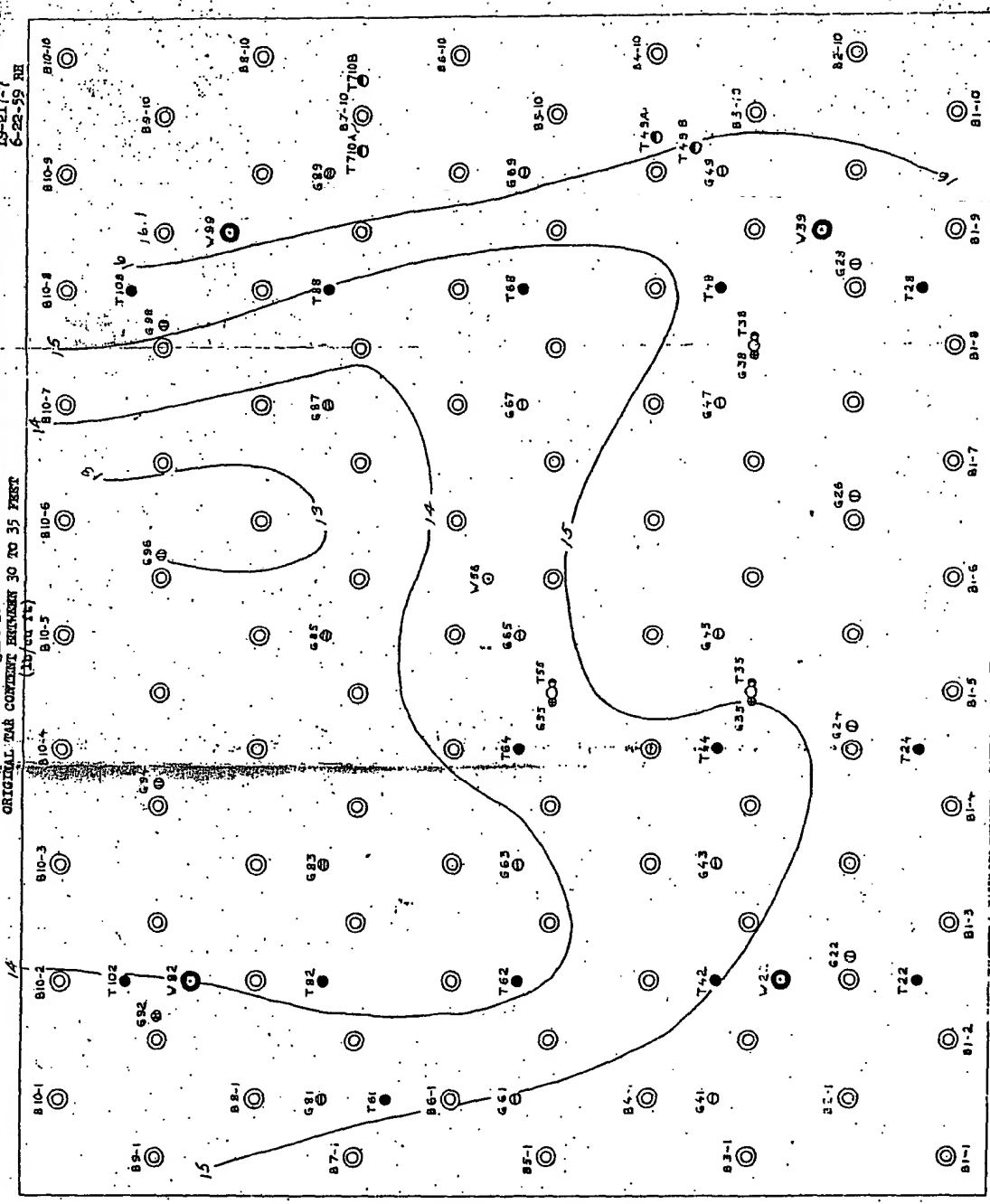
Figure 19
ORIGINAL BAR CHART BETWEEN 25 TO 30 FEET
(11-21-54)



● TEMPERATURE WELL 5'9" FROM ADJACENT BURNER. 55" 3/4" HOLE. 52'2" CASING.
○ IN BURNER HOLE. 52'1" CASING.
○ 3' (1498 4) FROM ADJACENT BURNER. 55" 3/4" HOLE. 52'2" CASING.

19-217-7
6-22-59 NE

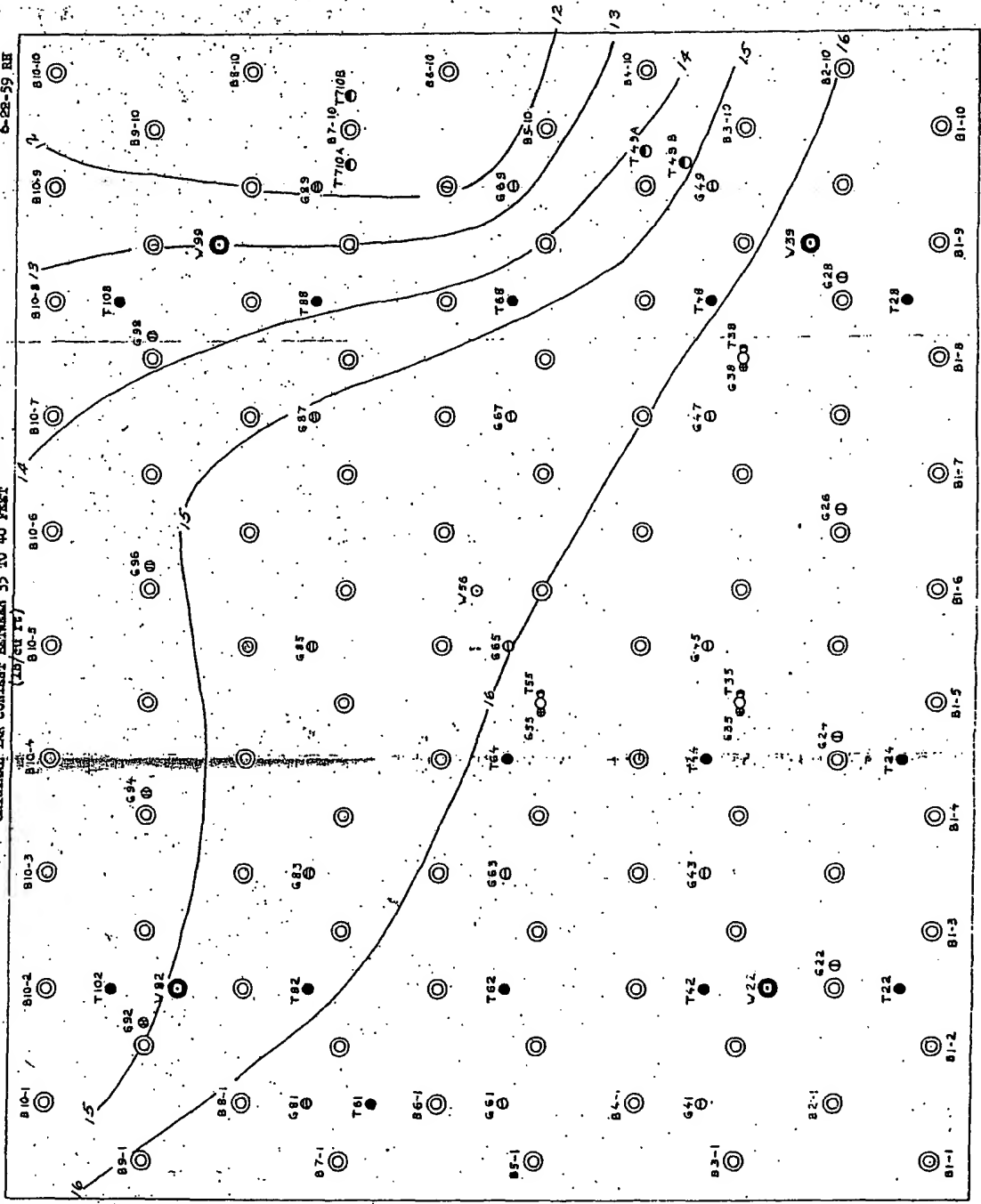
Figure 20
ORIGINAL AIR CONTENT EXTENDS 30 TO 35 FEET
(20/00 11)



● TEMPERATURE WELL, 5.9' FROM ADJACENT BURNER, 55' 3/4" HOLE, 52' 2" CASING.
● IN BURNER HOLE, 52' 1" CASING.
● (T+9B 4') FROM ADJACENT BURNER, 55' 3/4" HOLE, 52' 2" CASING.

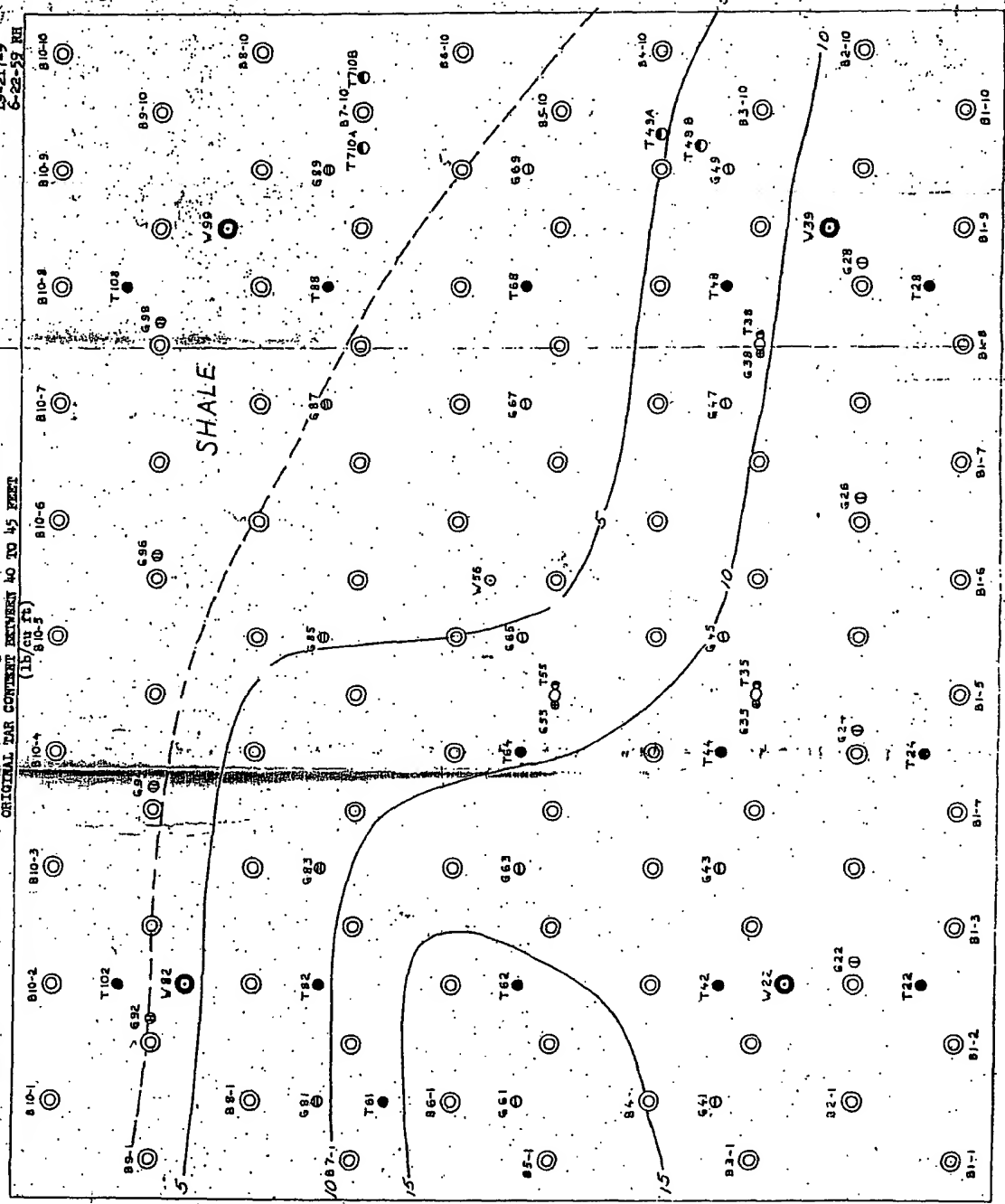
19-217-8
6-28-59 RH

Figure 21
ORIGINAL AIR CONCENTRATIONS 35 TO 40 FEET
(19/51 17)



● ● ● ● ●
● TEMPERATURE WELL 5.9" FROM ADJACENT BURNER. 55.3% HOLE. 52.2" CASING.
● IN BURNER HOLE. 52.1" CASING.
● 3" (T49B 4") FROM ADJACENT BURNER. 55.3% HOLE. 52.2" CASING.

உயர்தரம்



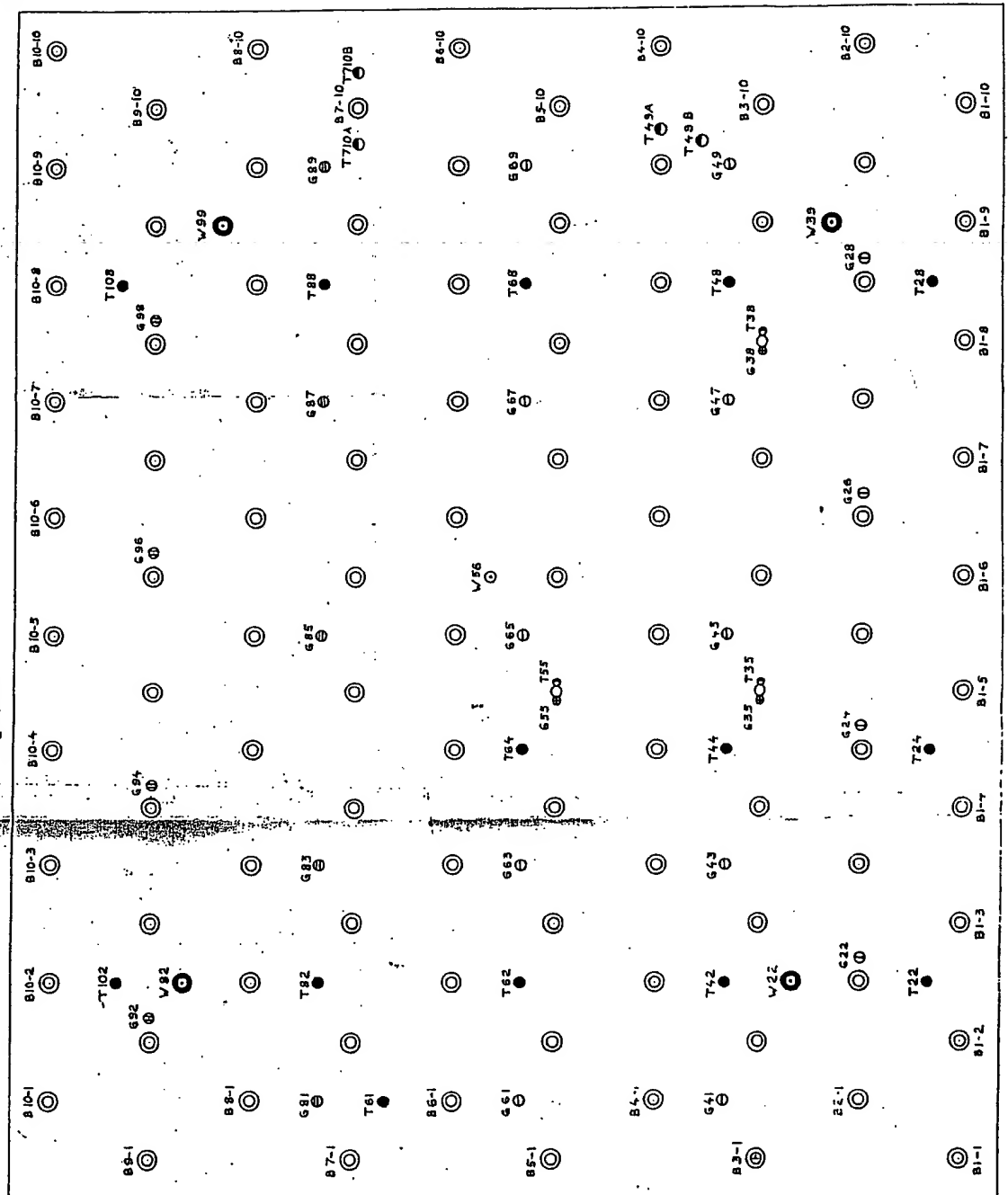
- TEMPERATURE WELL, 5.9' FROM ADJACENT BURNER, 55 3/4" HOLE, 52.2' CASING.
- IN BURNER HOLE, 52.1' CASING.
- 3' (T49B 4') FROM ADJACENT BURNER, 55 3/4" HOLE, 52.2' CASING.

IN BURNER HOLE, 52' 1" CASING
3' (T49B 4') FROM ADJACENT BURNER, 55' 3 3/4" HOLE, 52' 2" CASING.



| | | |
|---------|-------------|-----------------|
| L-9-101 | JAN 21 1958 | REVISED 3.15.58 |
|---------|-------------|-----------------|

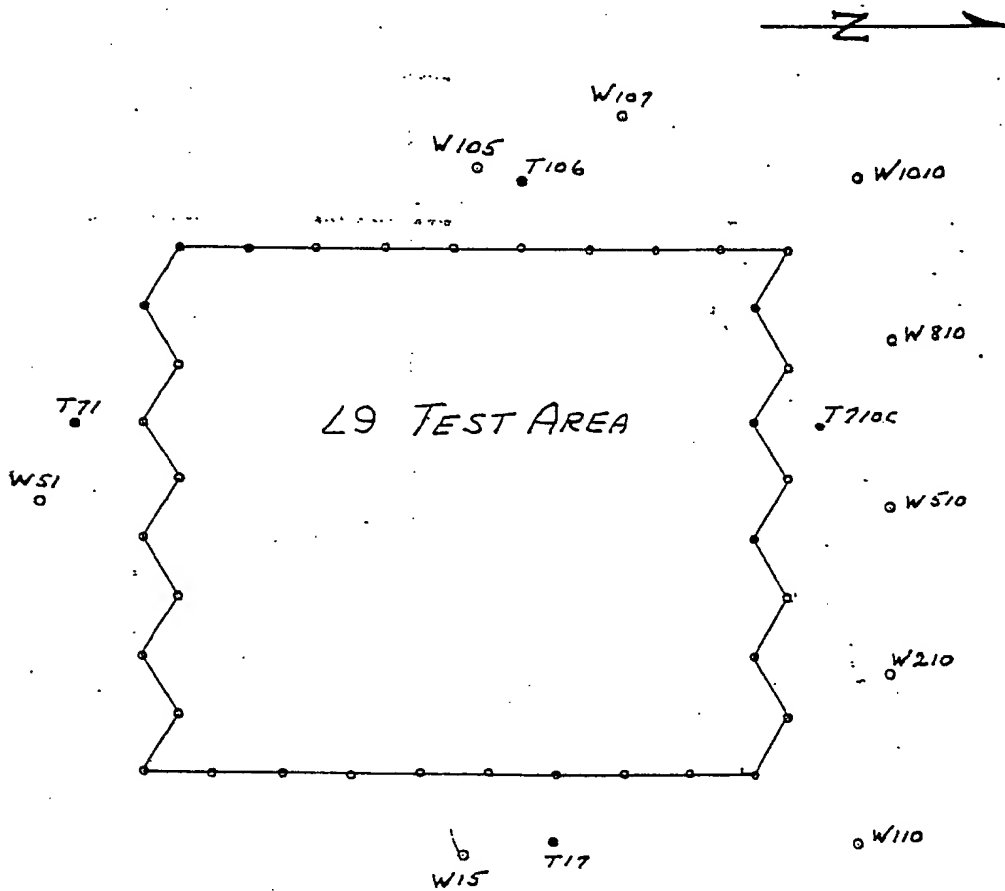
Figure 24



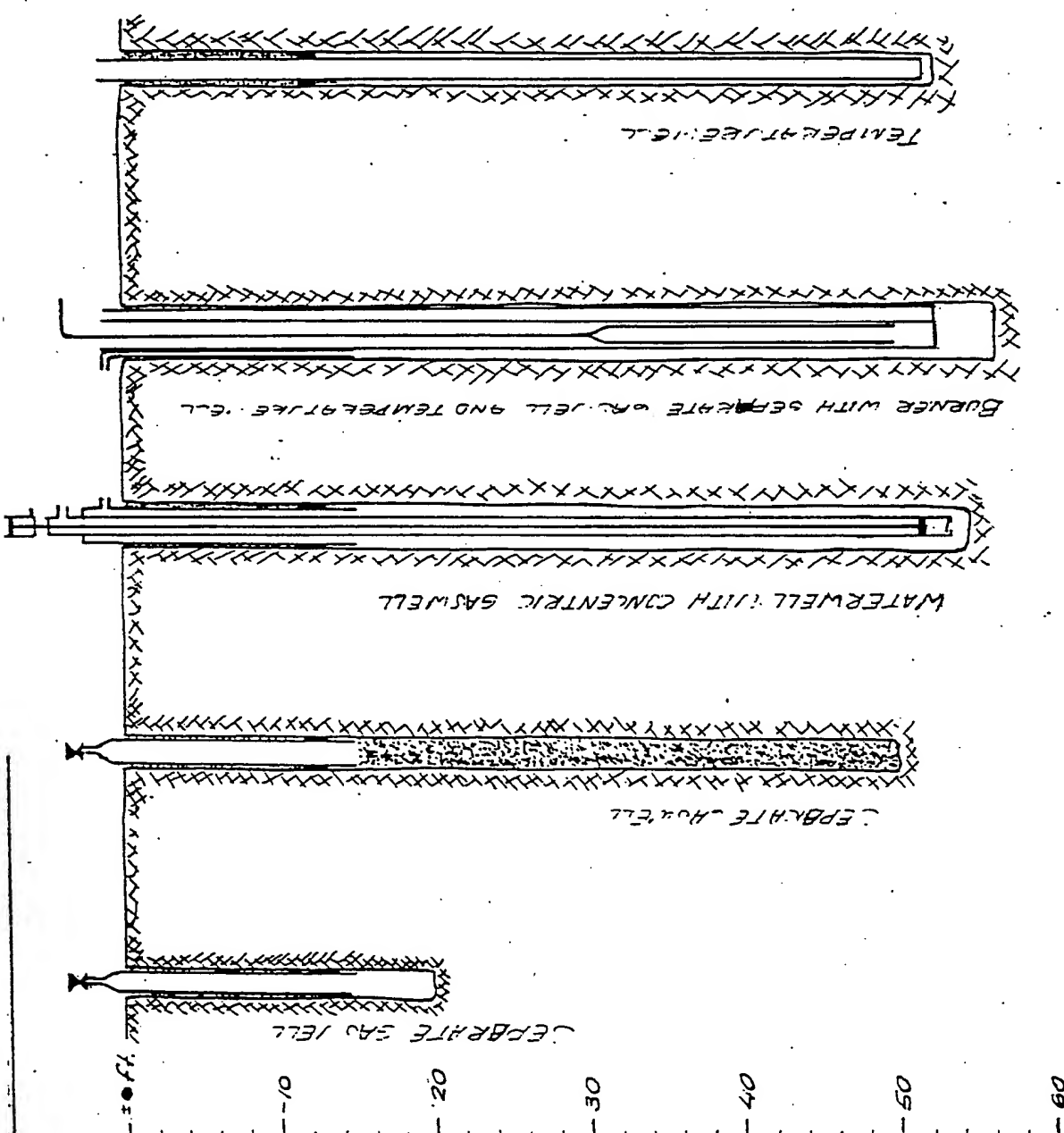
L9-105
5.26.59.BP

Figure 27

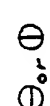
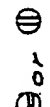
WATER WELLS AND TEMPERATURE WELLS OUTSIDE L9.



| <u>Well, No.</u> | <u>Location</u> |
|------------------|--|
| W15,105 | 12 feet outside the edge of the field. |
| W51,105,110,210 | 15 " " " " " " " |
| W510,810,1010 | 15 " " " " " " " |
| W107 | 20 " " " " " " " |
| T17 | 10 " " " " " " " |
| T71 | 10 " " " " " " " |
| T710C | 10 " " " " " " " |
| T106 | 10 " " " " " " " |
| | B1-7. |
| | B7-1. |
| | B7-10 |
| | B10-6 |



SYMBOLS FROM
DRAWING L 9-101.

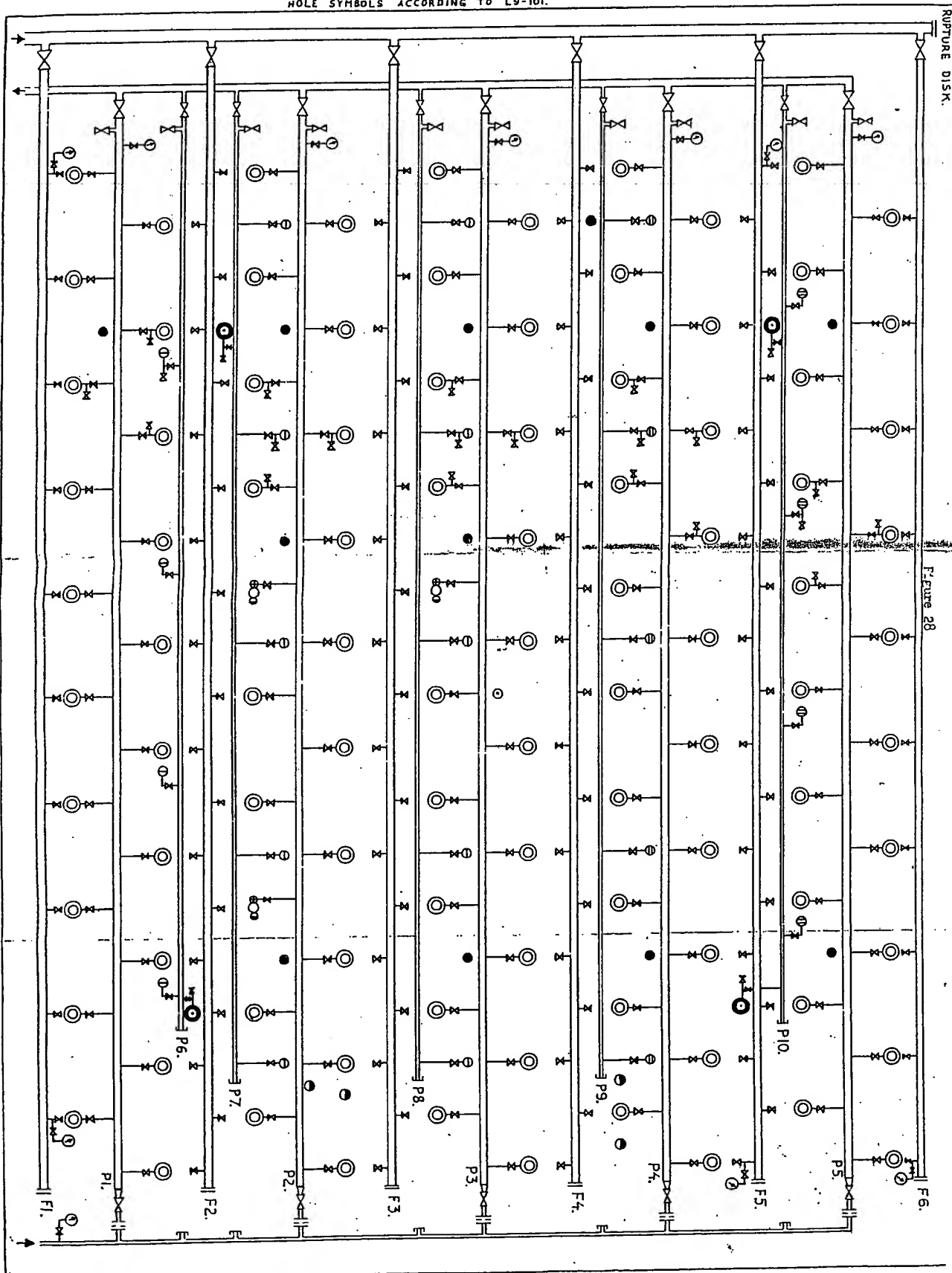


F-, P- AND R-LINES OF TEST L9.

F-LINE, 3" P-LINE, 1"
 F-LINE, 2" R-LINE, 1"
 P-LINE, 2" 1/2" PIPE.

HOLE SYMBOLS ACCORDING TO L9-101.

L 9-102
 JAN. 24, 1958. 8P



1X 15 / 95B (3)

To L9

FUEL STATION FOR L9

Figure 29

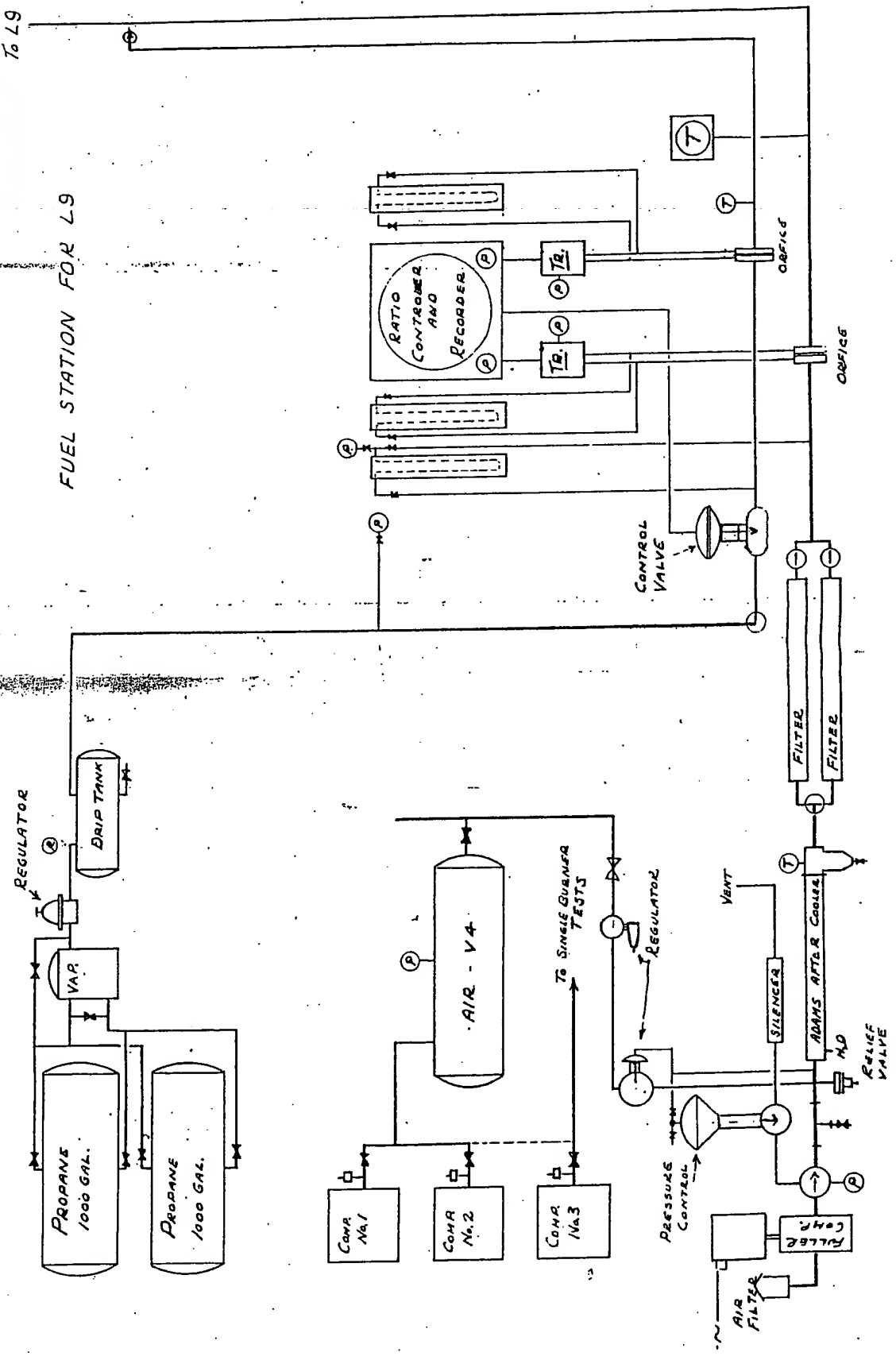
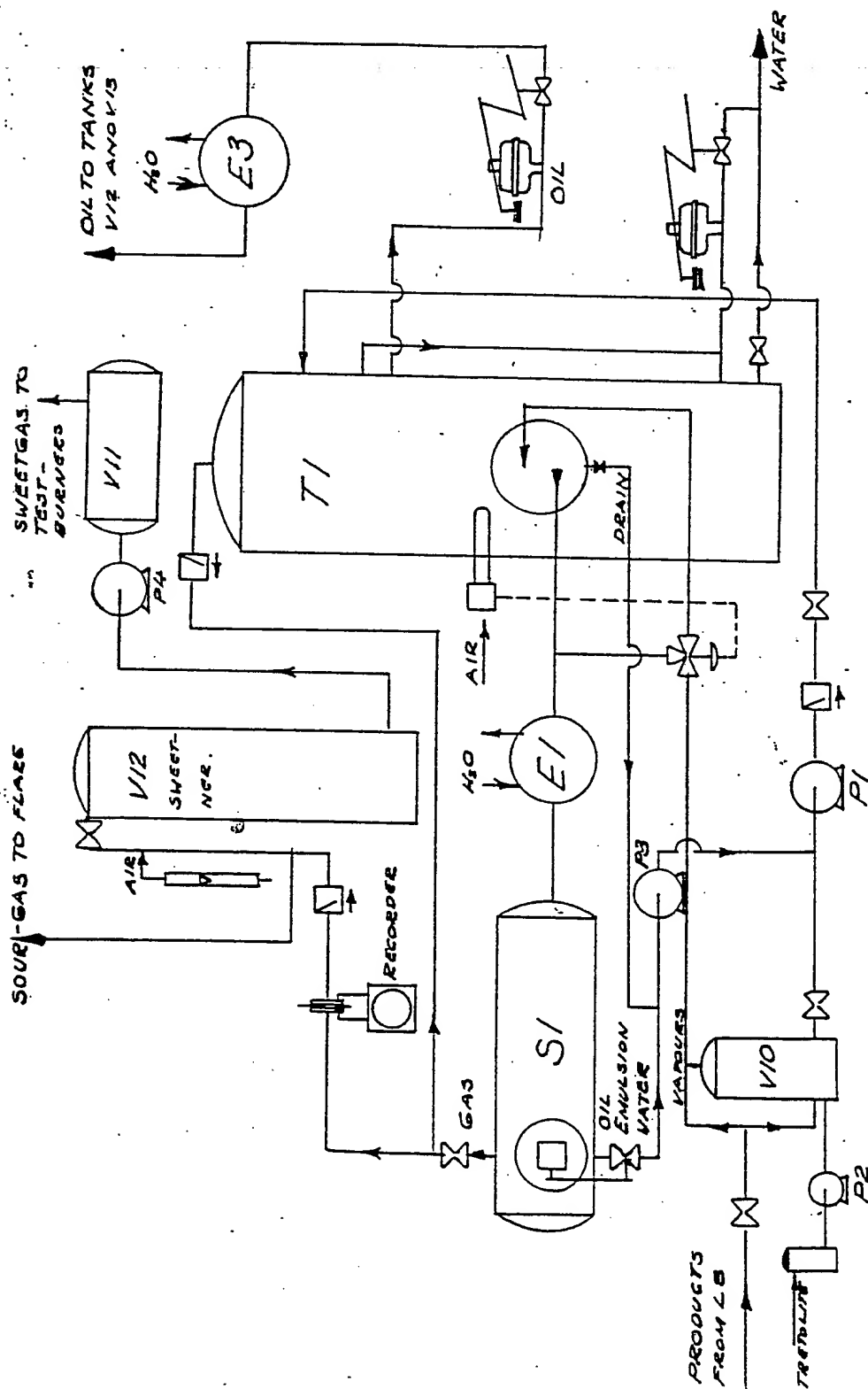


Figure 30

PRODUCT STATION
FOR L8A

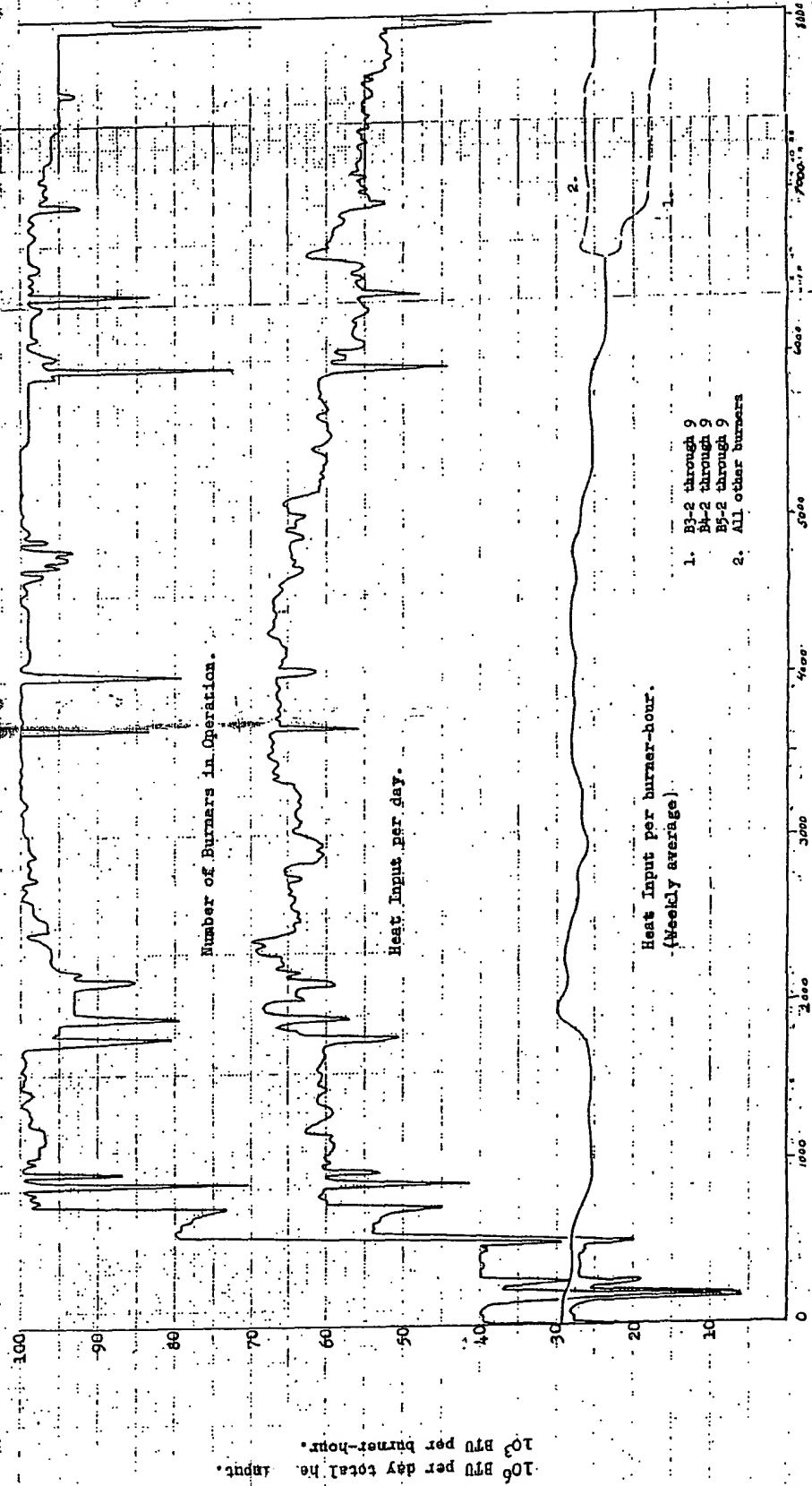
L8 - 110
10-16-1957



19-316.
3.25.59, BP

Figure 31

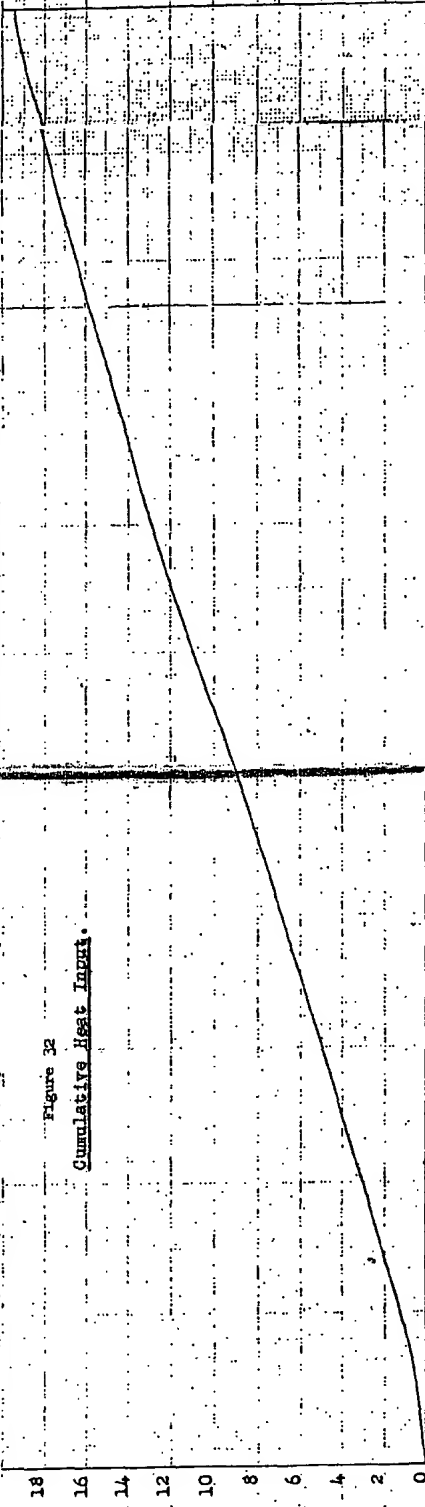
19 HEAT INPUT DATA



19-437
3.88.59.

Figure 32

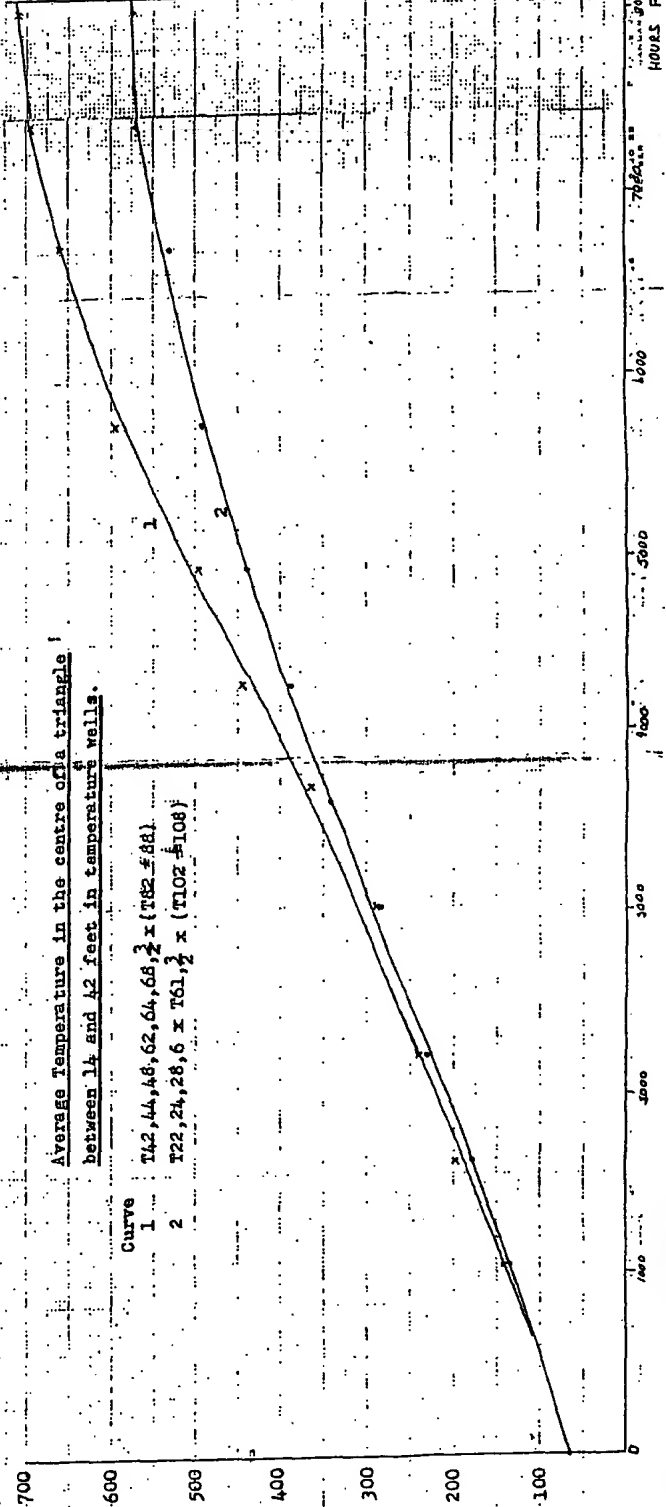
Cumulative Heat Input.



Average Temperature in the centre of a triangle
between 14 and 42 feet in temperature wells.

Curve

- 1 $T_{42} 44, 48, 62, 64, 68, 72 \times (T_{82} \pm 42)$
- 2 $T_{22} 24, 28, 6 \times T_{61}, 72 \times (T_{102} \pm 108)$



19-335
10-10-59 BP.

Figure 33
Sandless in 19 Burners.

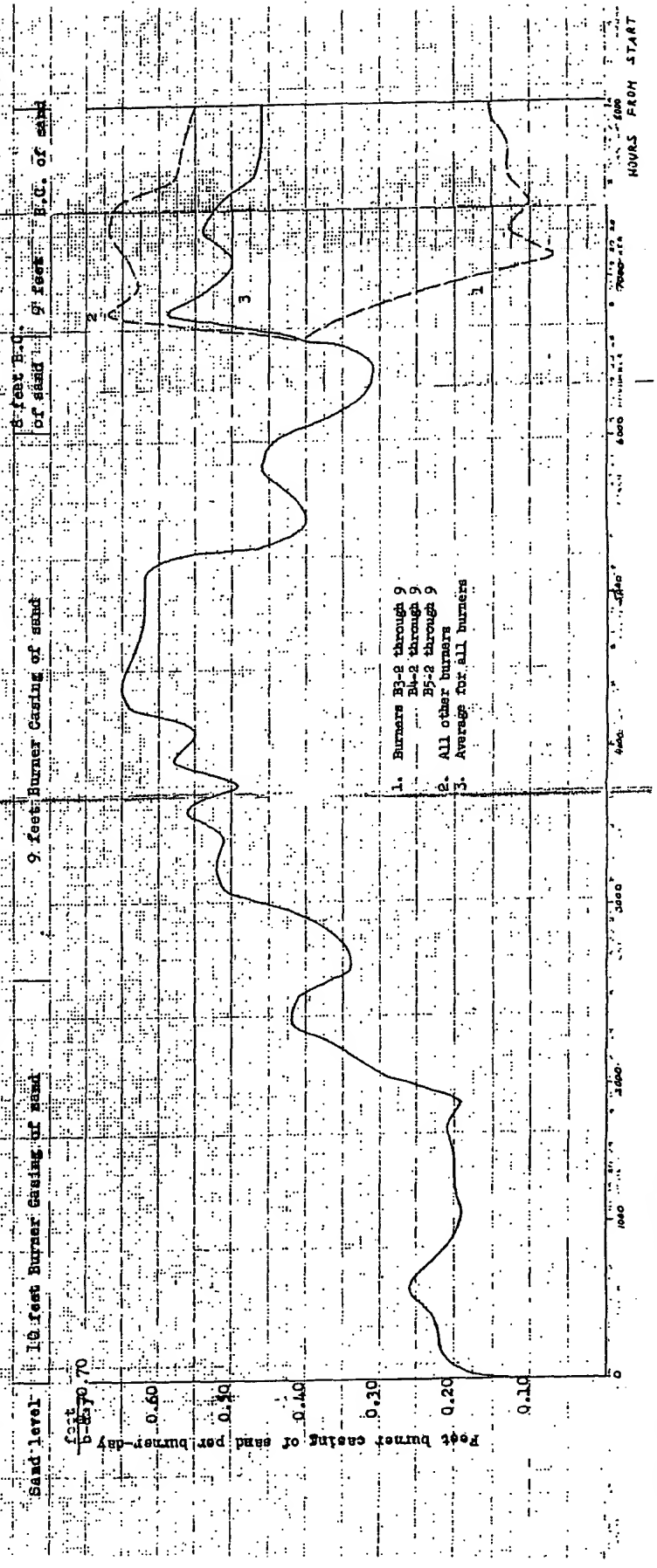


Figure 34

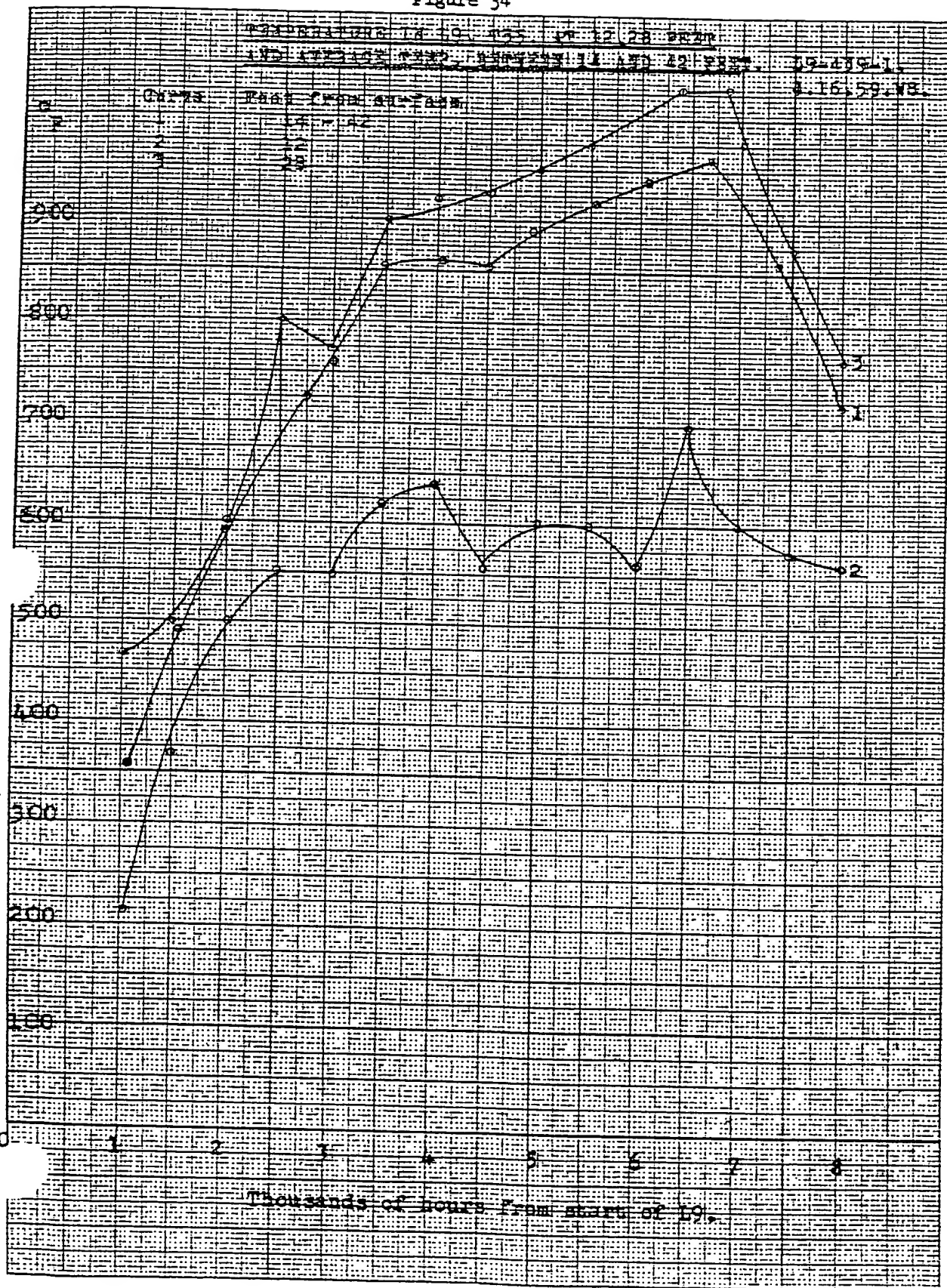


Figure 35

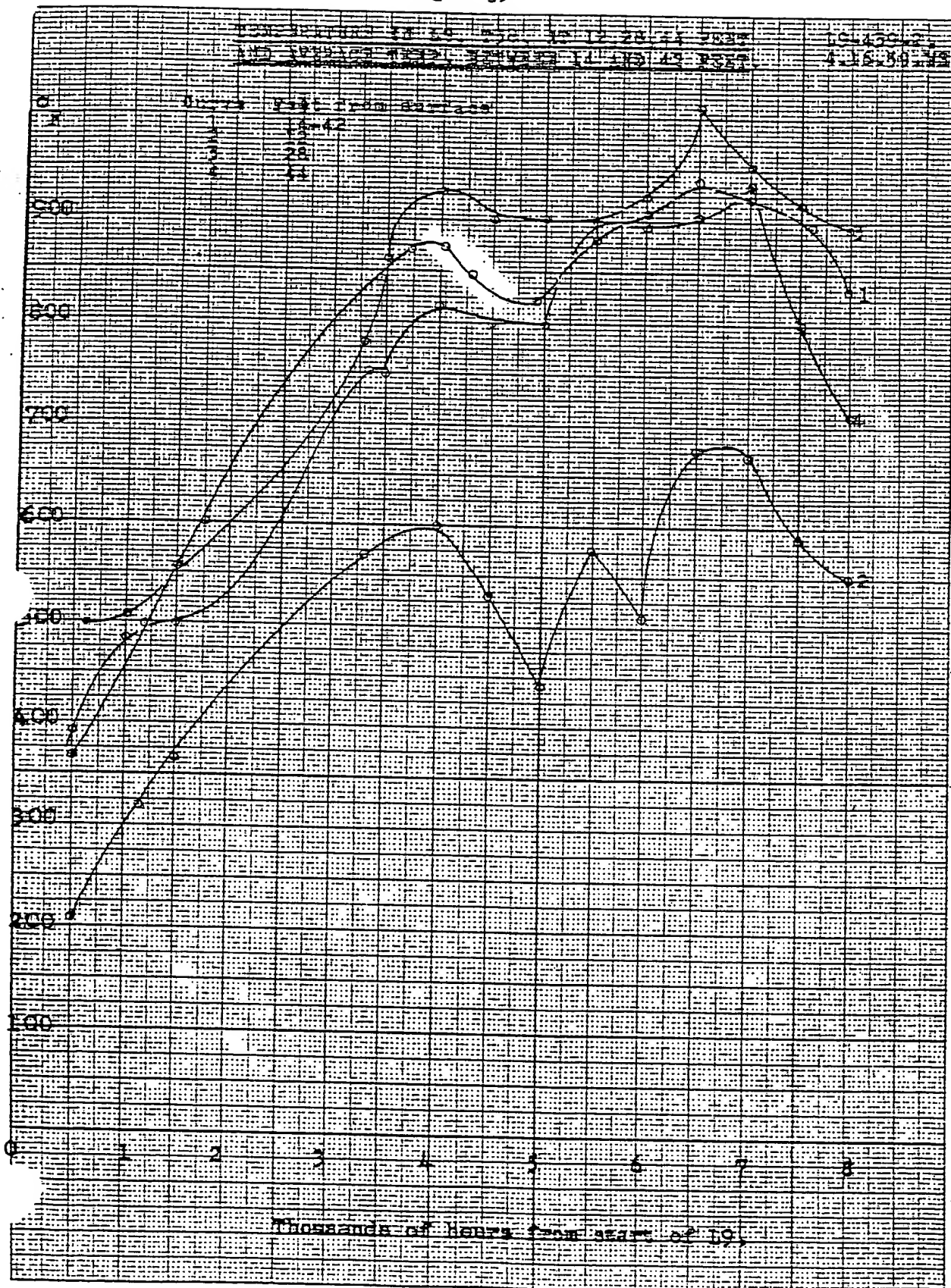


Figure 36

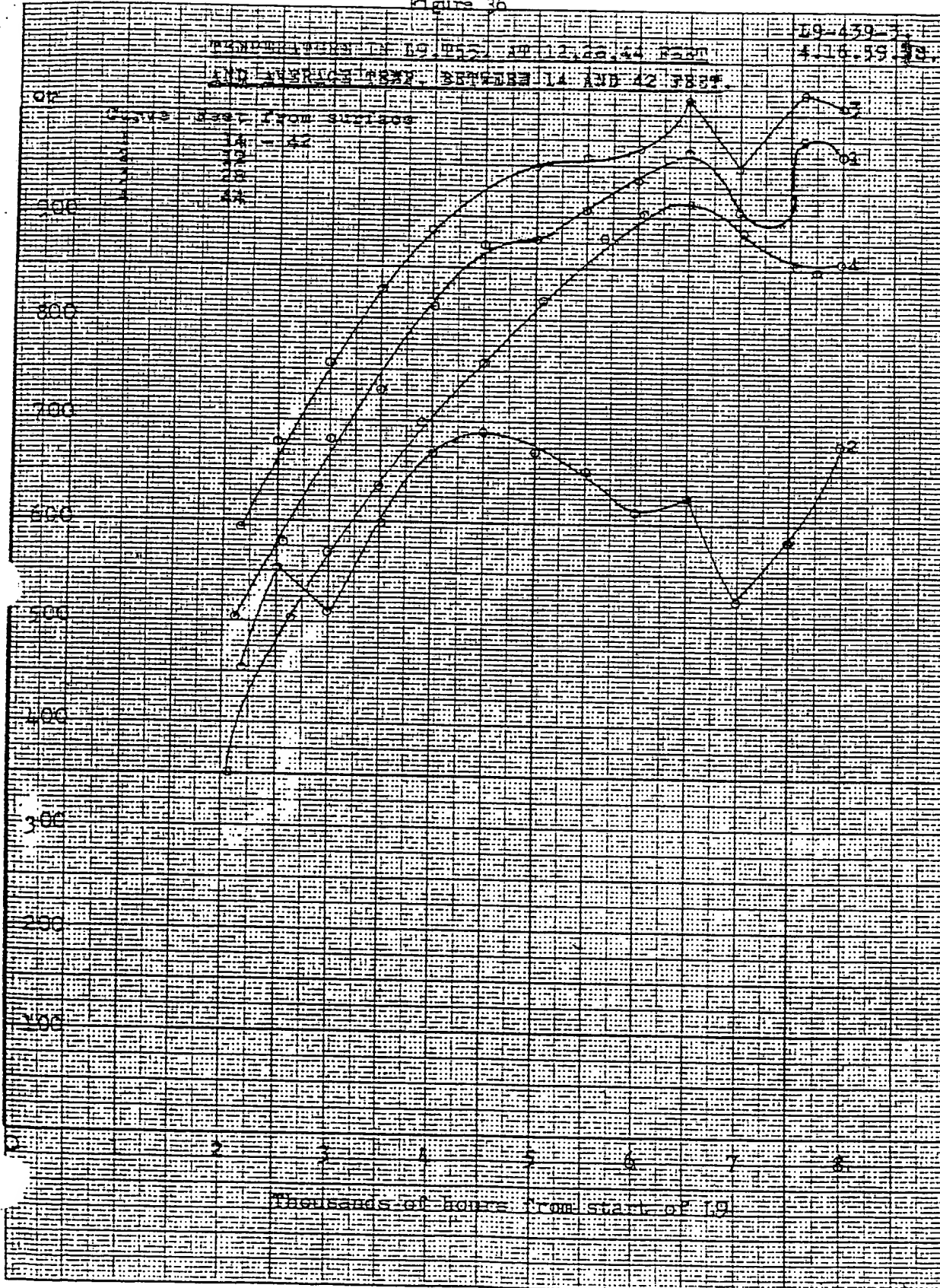


Figure 37

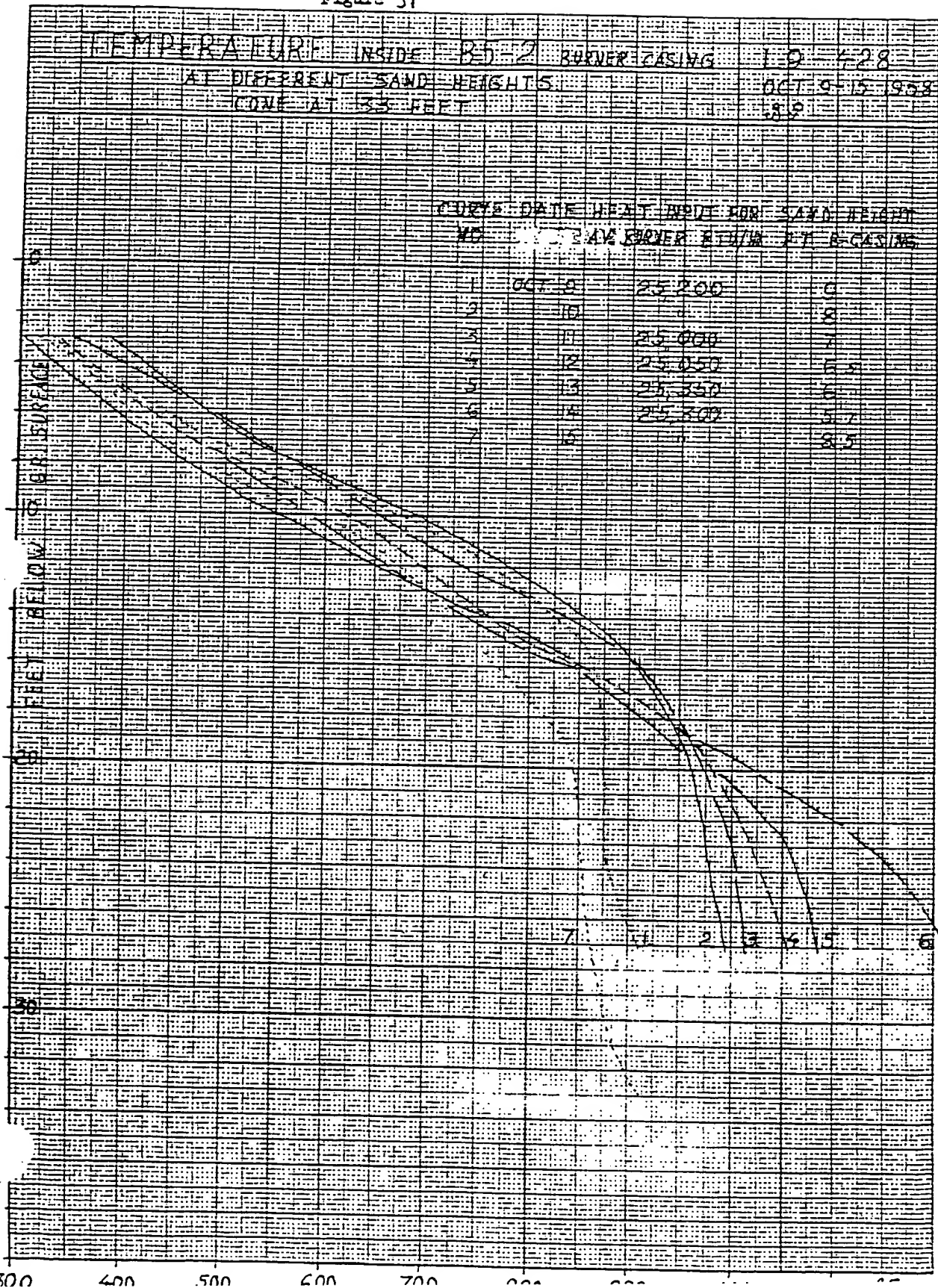


Figure 38

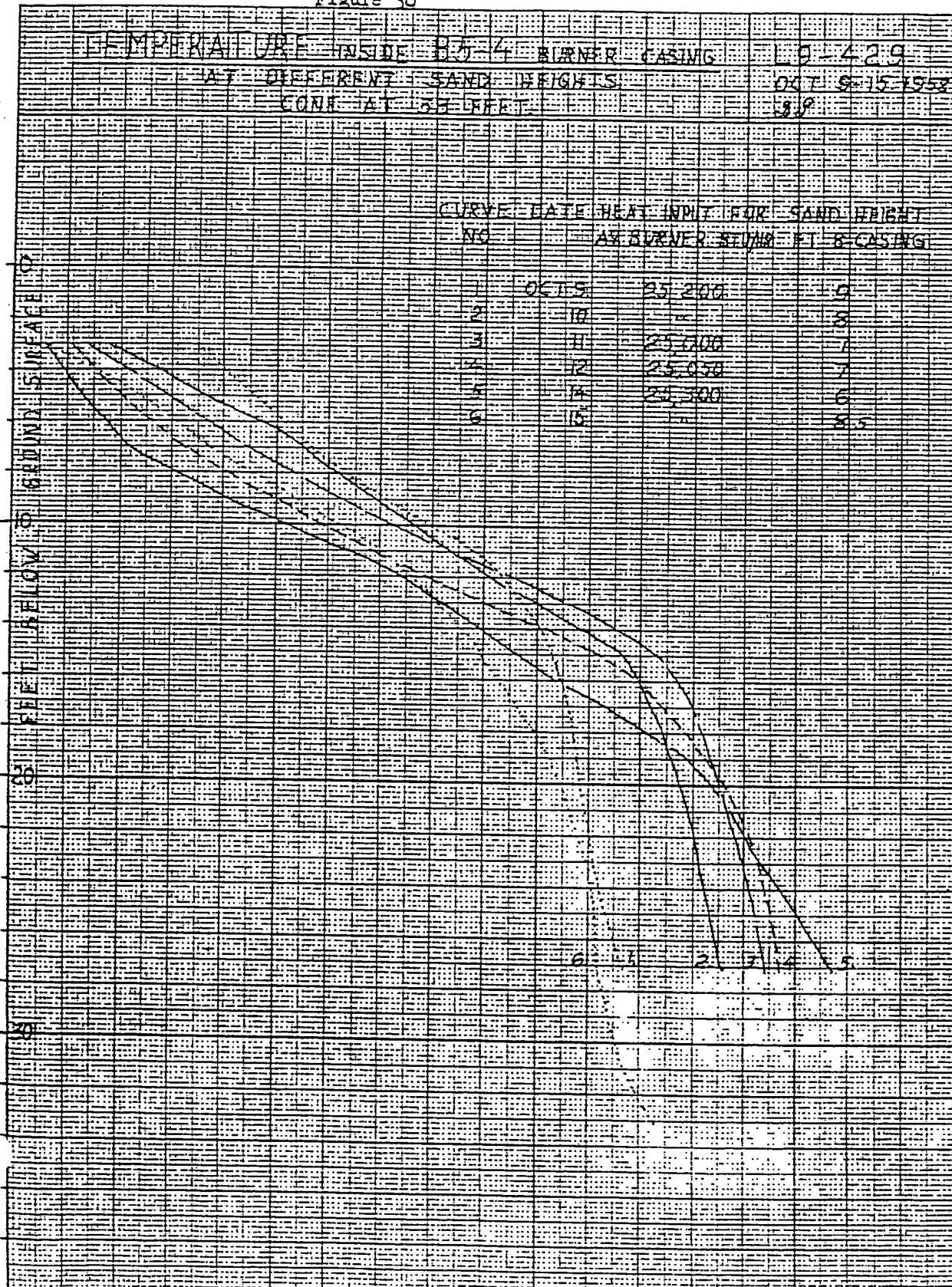


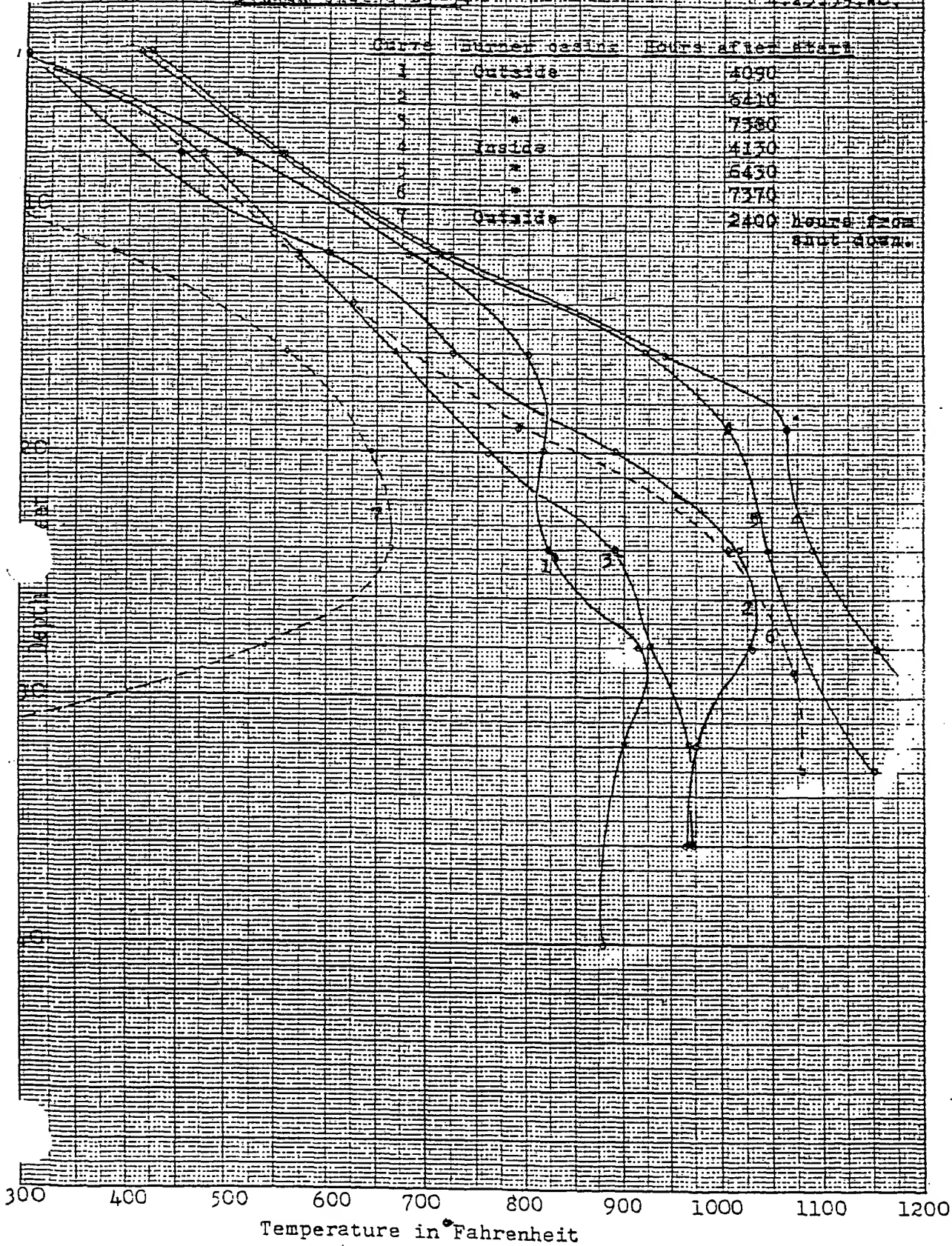
Figure 39

TEMPERATURE OUTSIDE (73°F) AND INSIDE
BURNER CASING 31-5

12-541-1

4-27-59, 73

| Curve | Burner casing | Hours after start |
|-------|---------------|--------------------------------|
| 1 | Outside | 4090 |
| 2 | " | 6410 |
| 3 | " | 7580 |
| 4 | Inside | 4130 |
| 5 | " | 6430 |
| 6 | " | 7370 |
| 7 | Outside | 2400 hours from start down. |



L. DITTOEN CO.
MADE IN U. S. A.

Figure 40

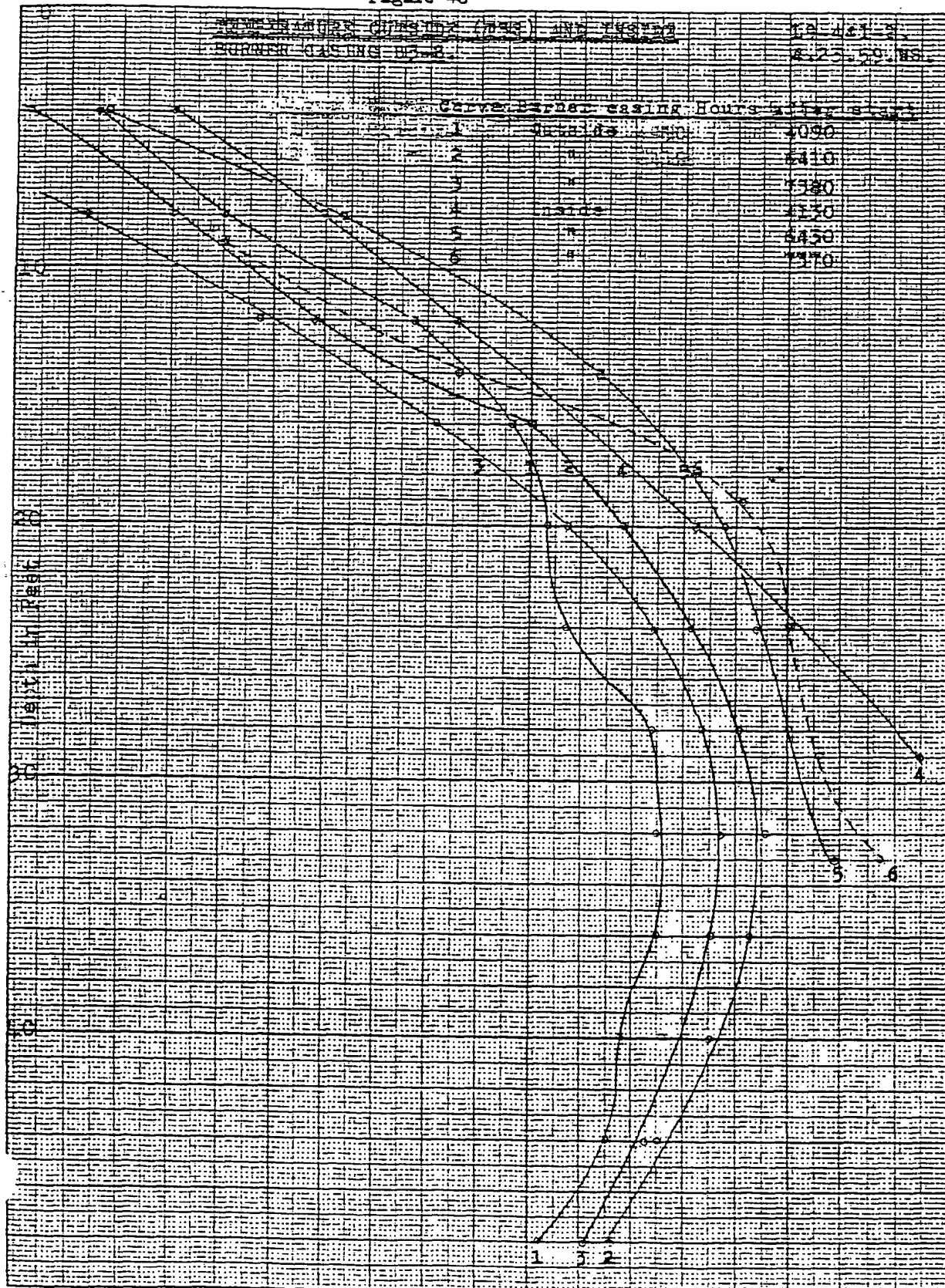


Figure 41

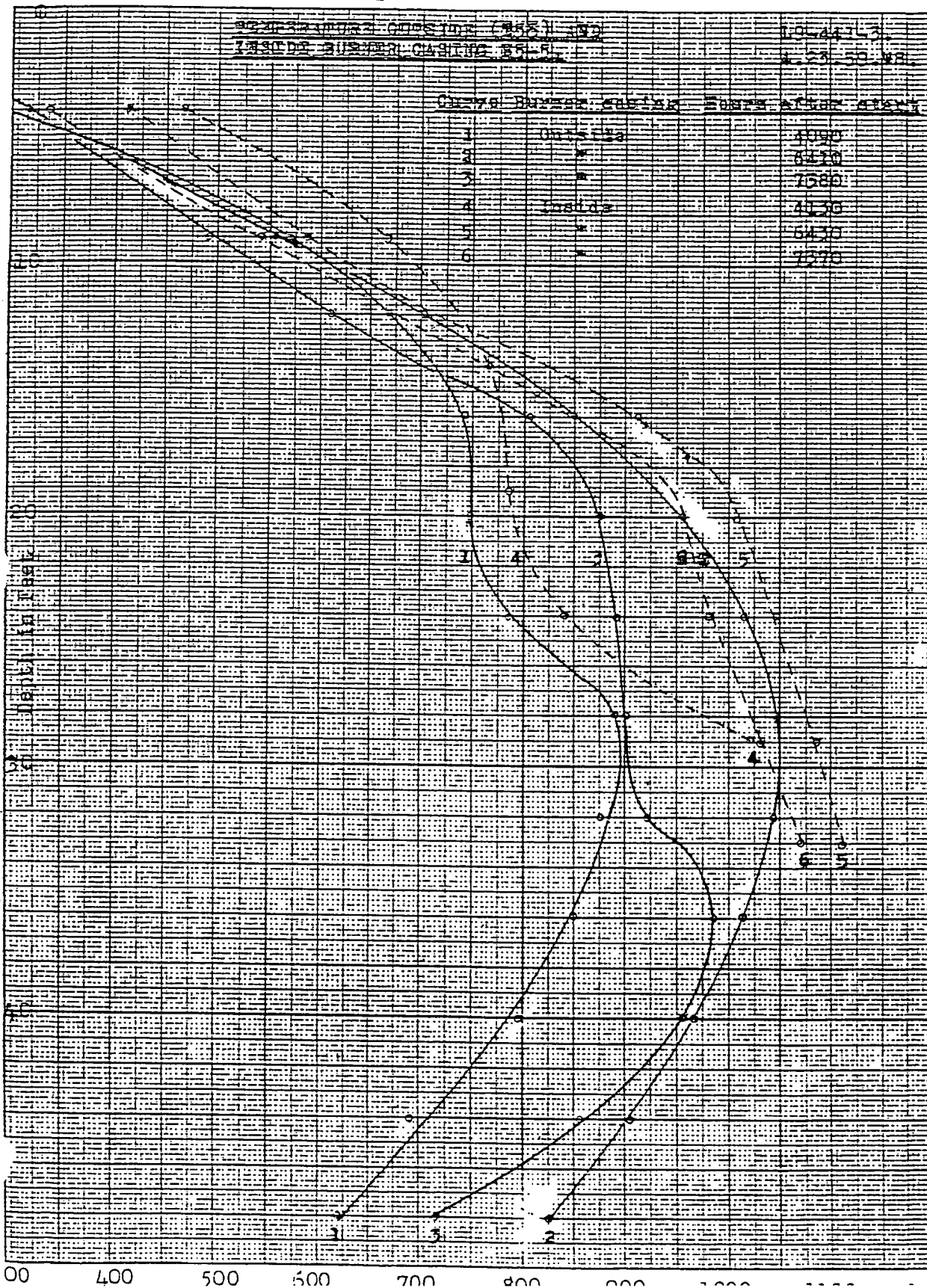


Figure 42

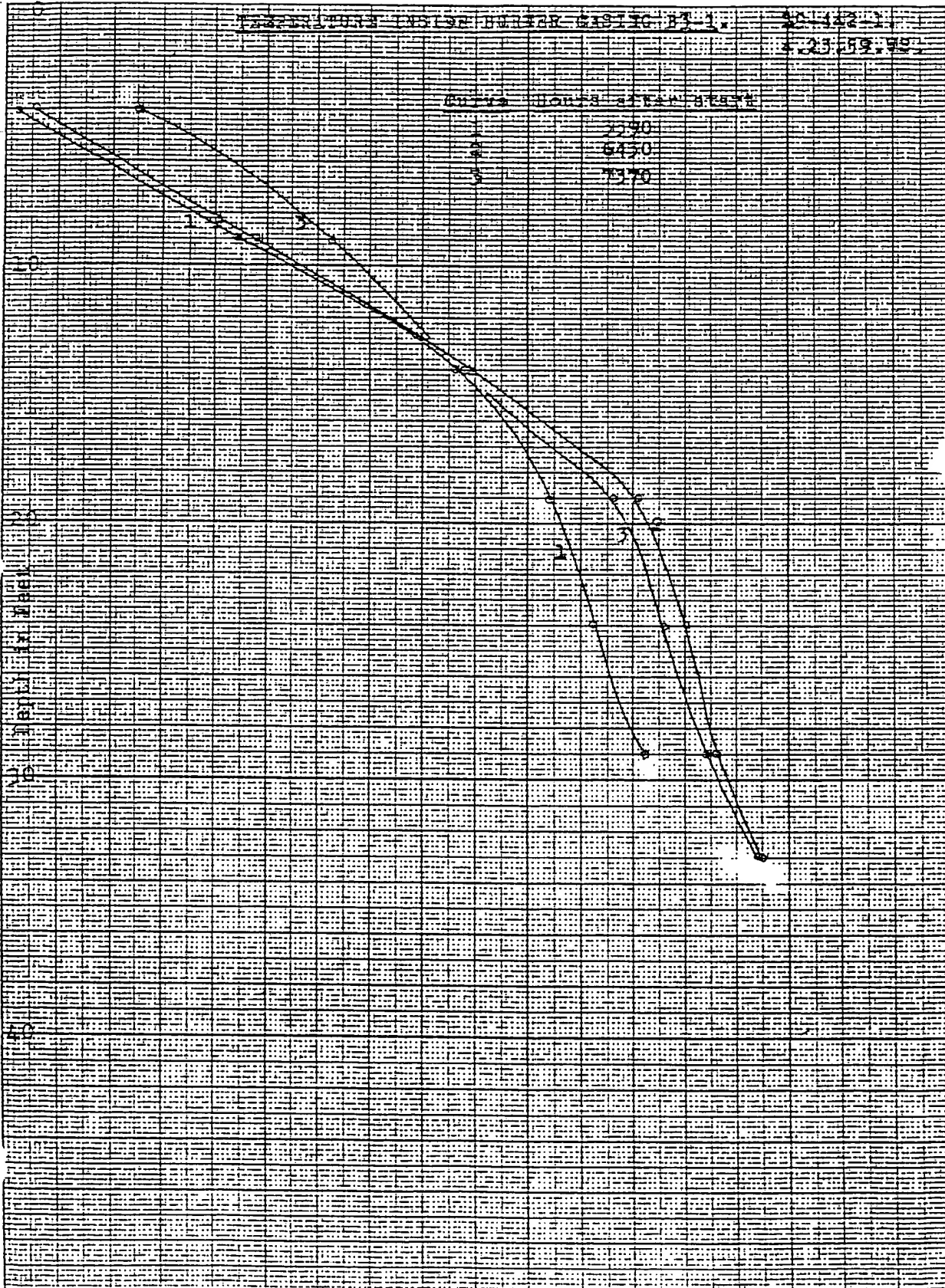


Figure 43

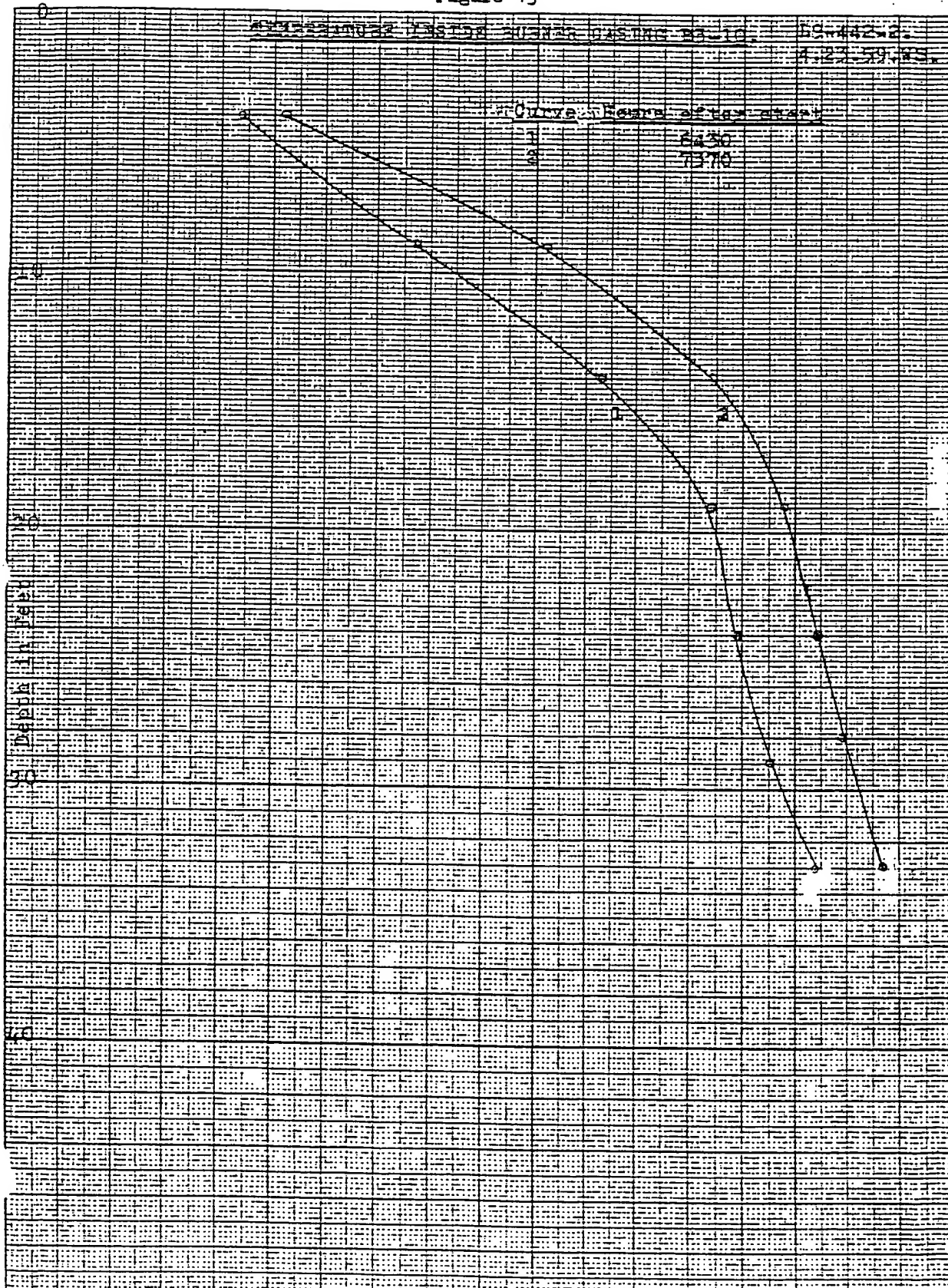


Figure 44

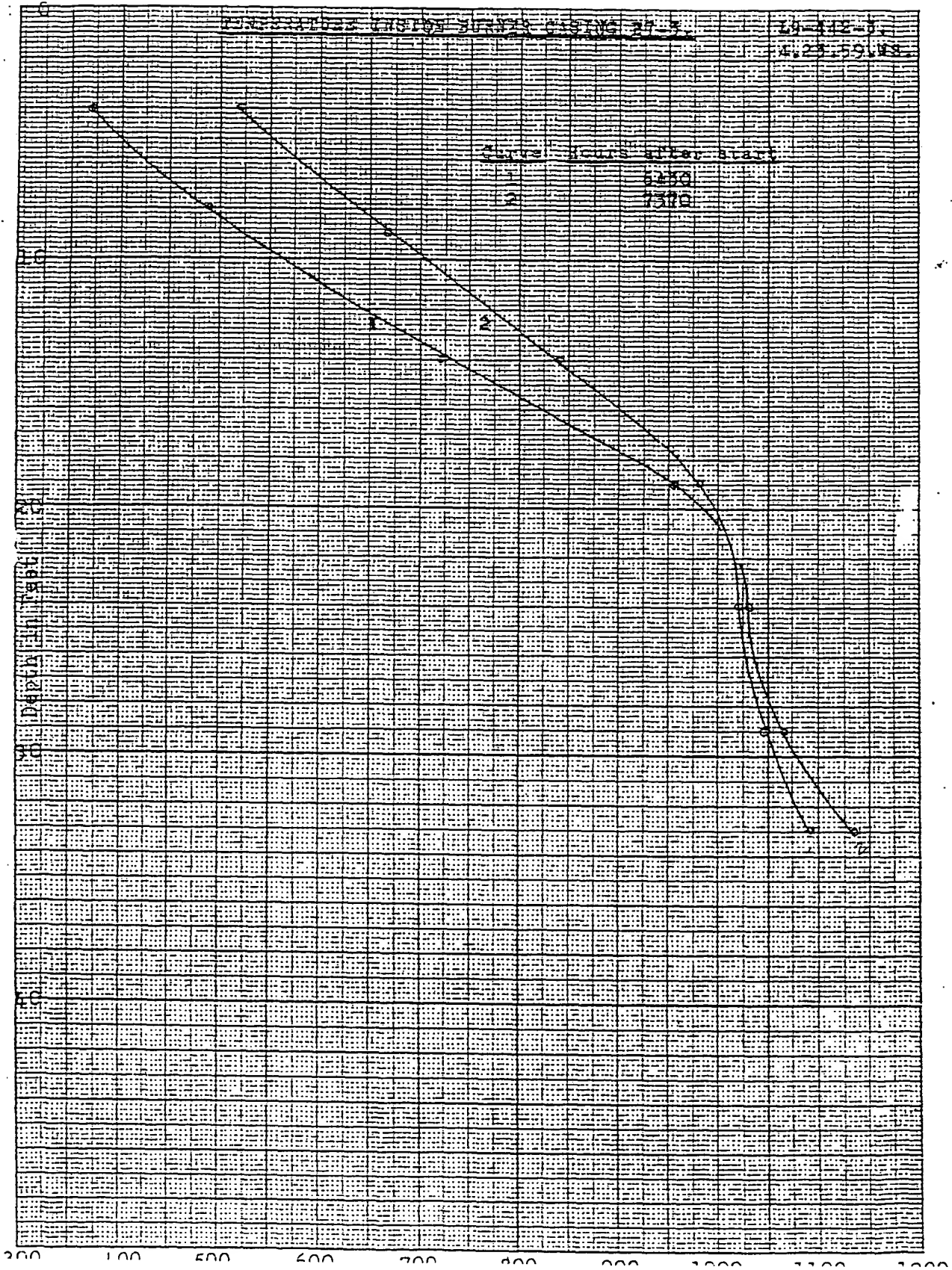


Figure 15

WATER TABLE IN THE BORED CASING OF WELL

10-412-4
4.25.59.75

Curve

WATER TABLE

5130
7370

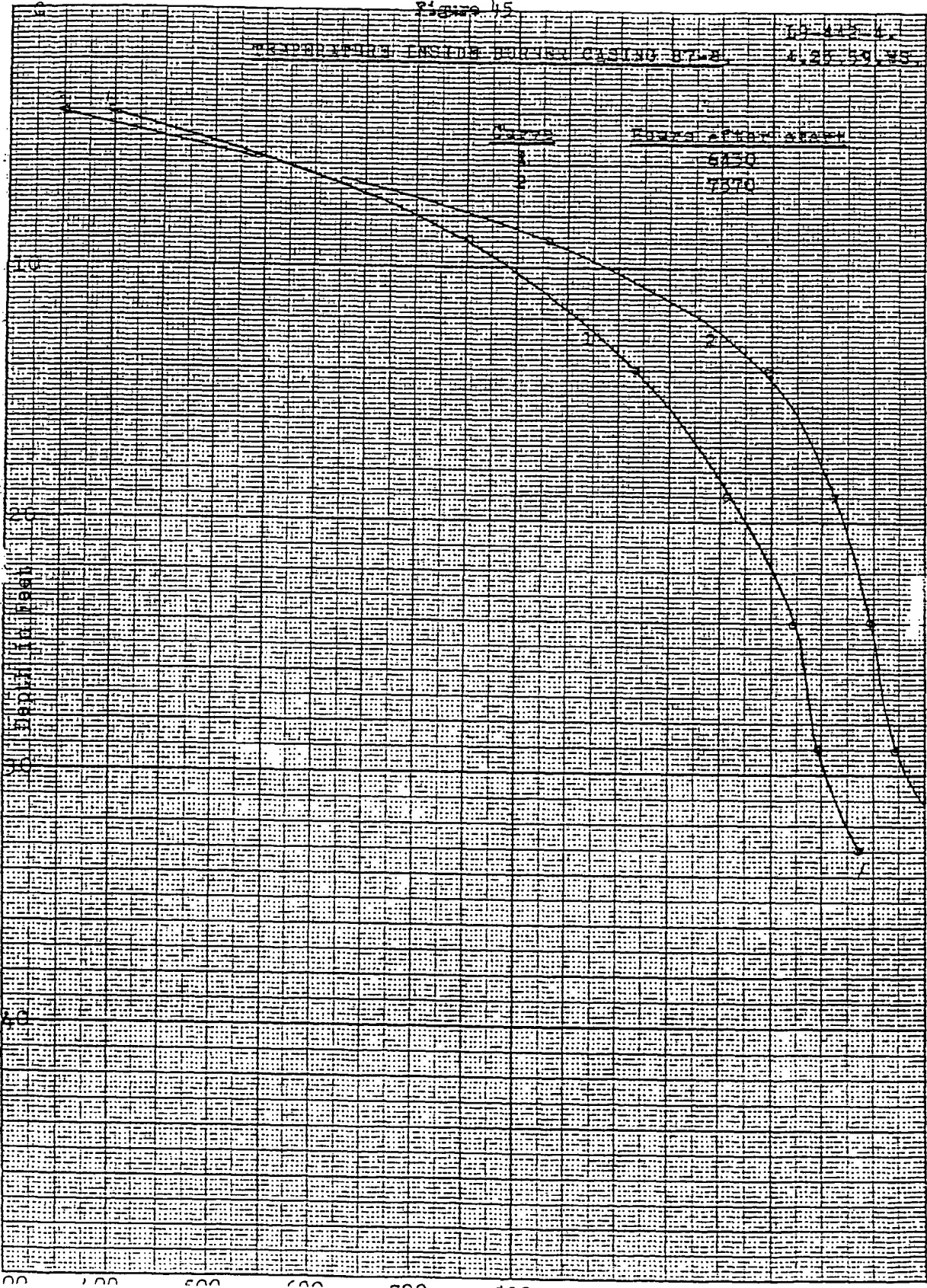


Figure 16

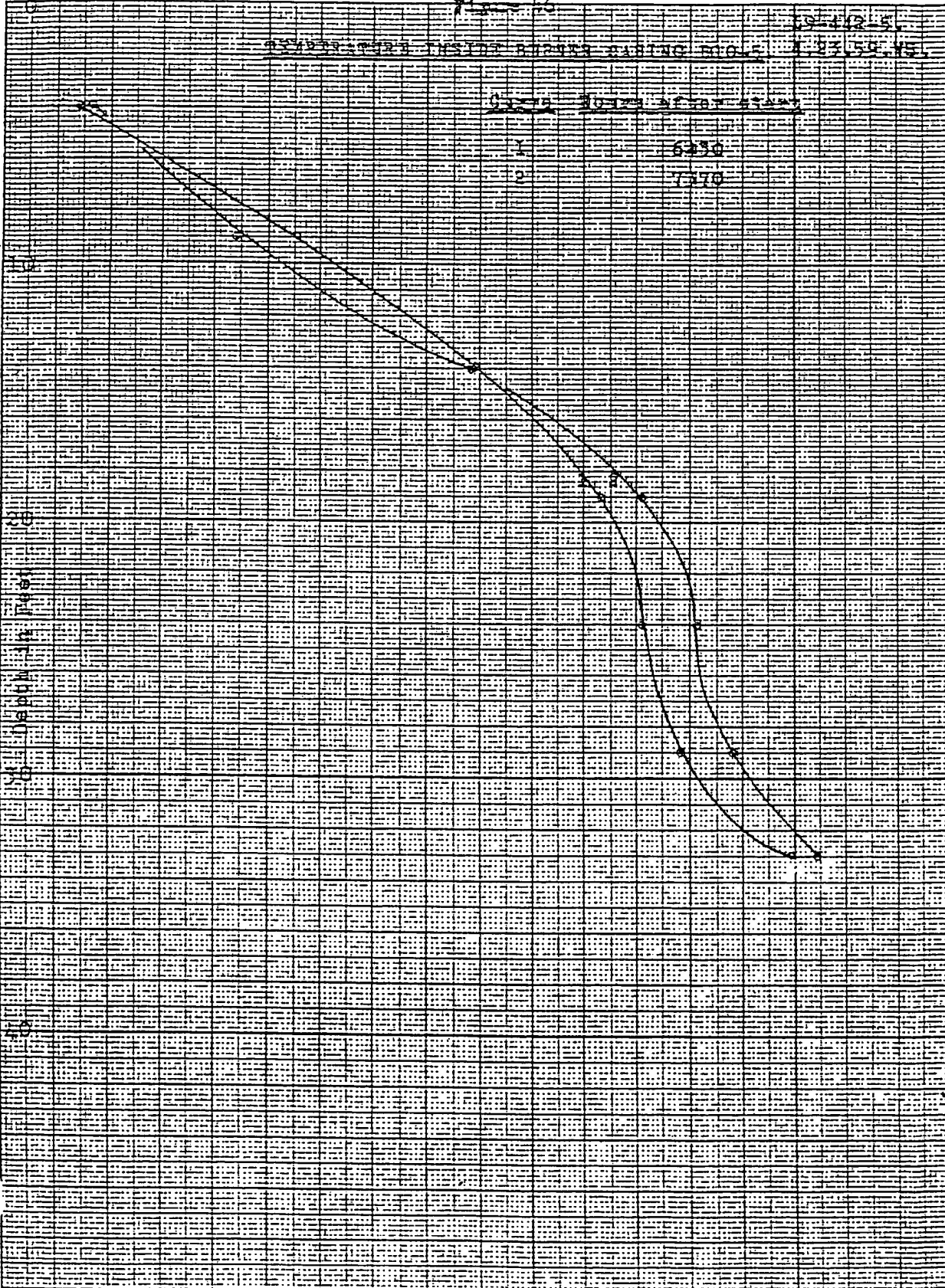
19-412-5

TEMPERATURE INSIDE BATTERY DURING CHARGE

CHARGE TOTAL AFTER START

1 6450

2 7170



300 400 500 600 700 800 900 1000 1100 1200

Figure 47

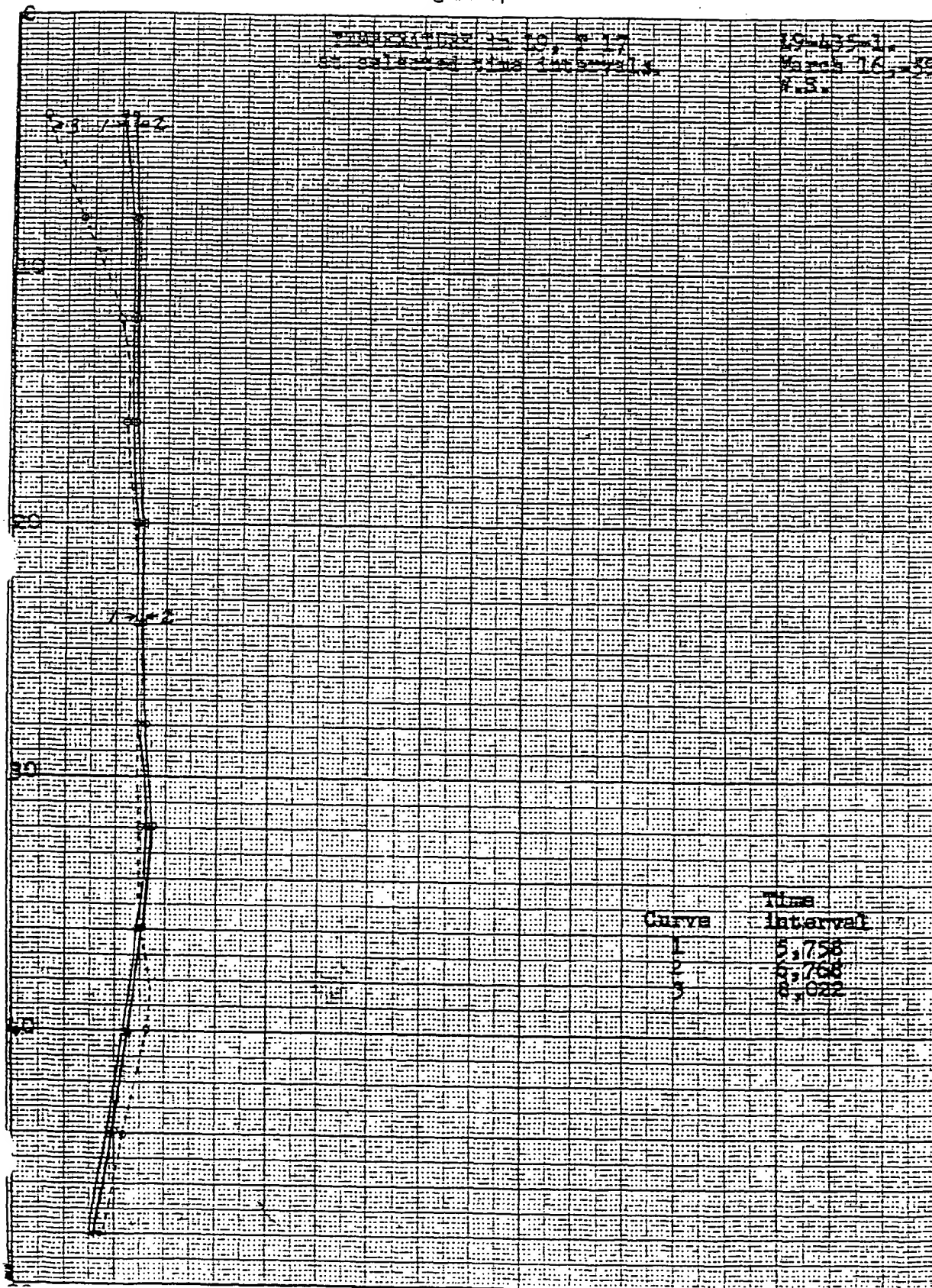


Figure 48

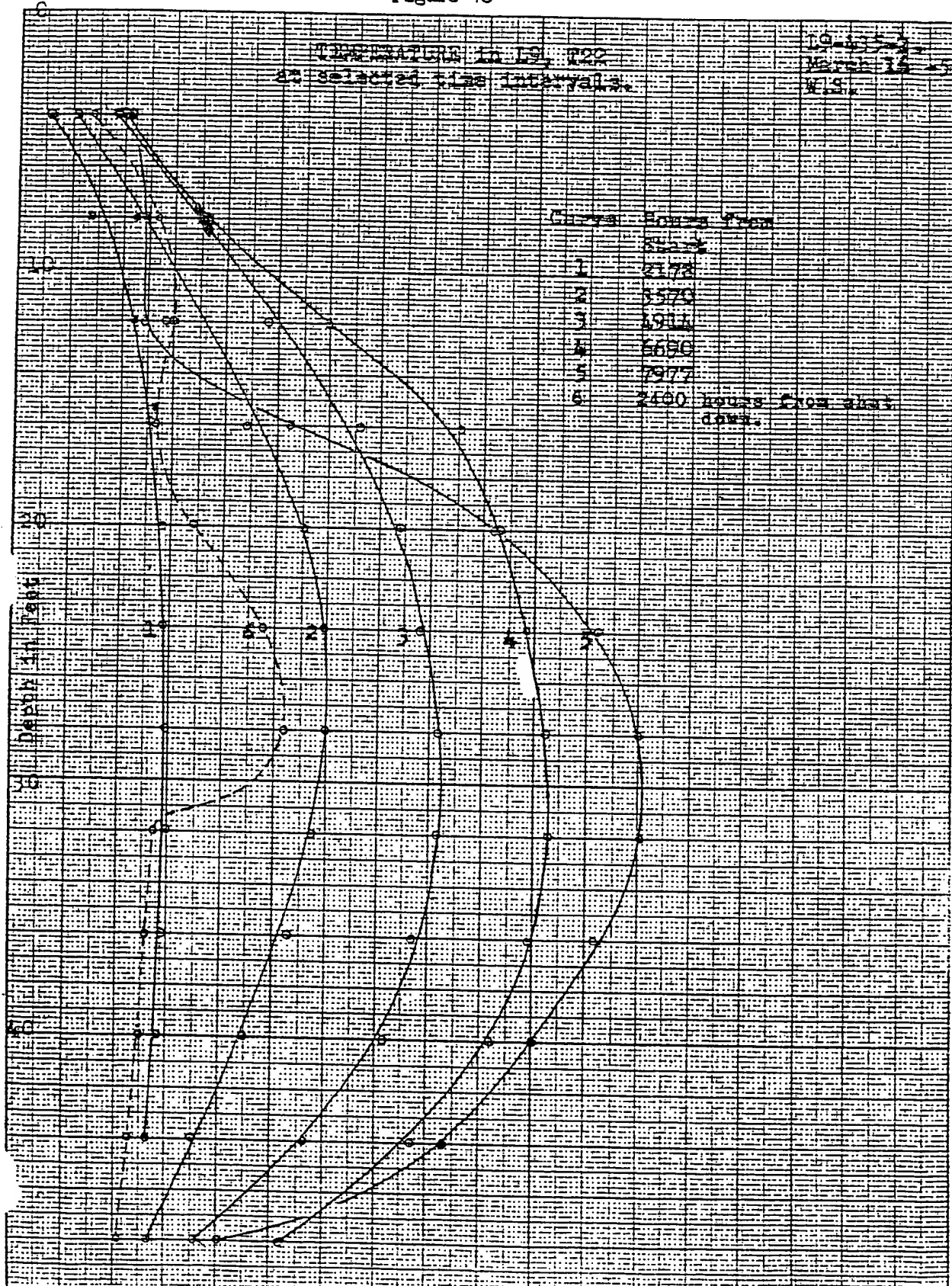


Figure 10

TEMPERATURES in IG, 125
at selected time intervals.

IG-435-3
March 18, 1955
U.S.

| Curve | Hours From |
|-------|--------------------------------|
| | Start |
| 1 | 2378 |
| 2 | 3570 |
| 3 | 4914 |
| 4 | 6650 |
| 5 | 7977 |
| 6 | 2400 hours from about down. |

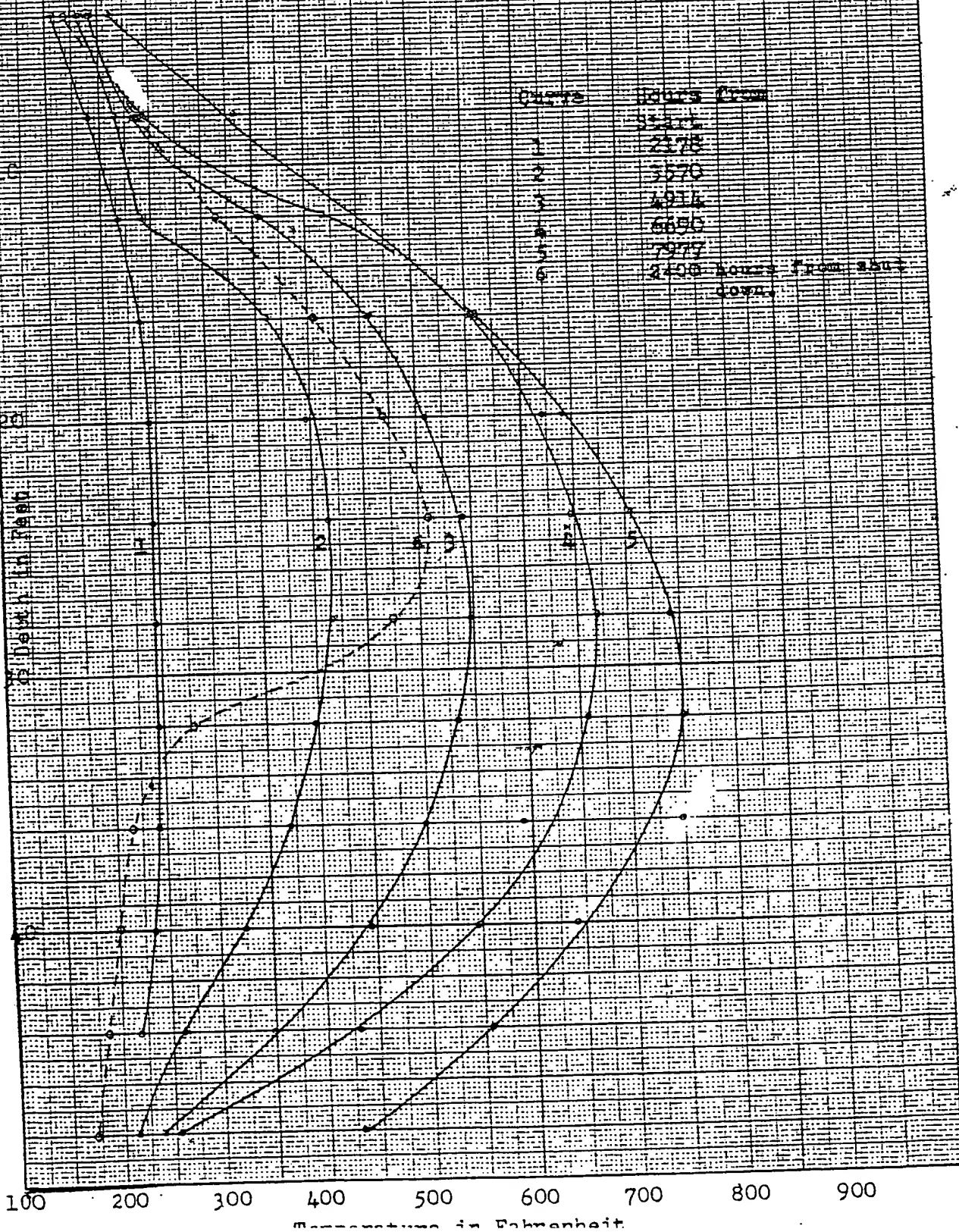


Figure 50

Temperature vs. depth
at selected time intervals.

10-13-54
March 13, 54
W.S.

| Time | Hours from Start |
|------|---------------------|
| 1 | 2173 |
| 2 | 2370 |
| 3 | 2914 |
| 4 | 6600 |
| 5 | 7977 |

Hours from
Start down

700
2400 hours from start
down.

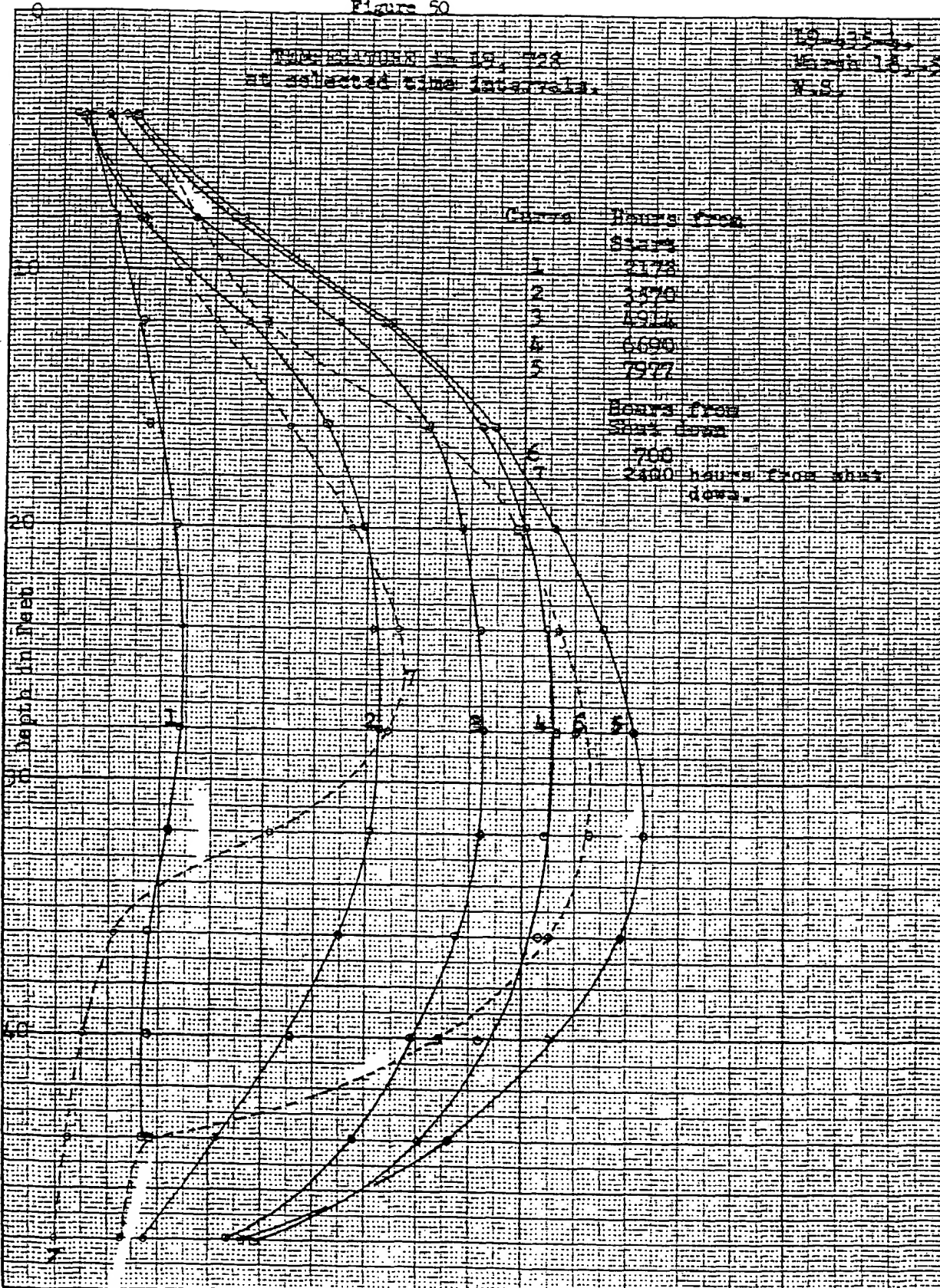


Figure 57
TEMPERATURE IN 10' TO
20' DEPTH AT SELECTED TIME INTERVALS

Station
Date
U.S.

Chart
Time
Date

Start
End

2178

2218

2258

2314

2350

2417

2440

2400 HOURS FROM START
DOWN

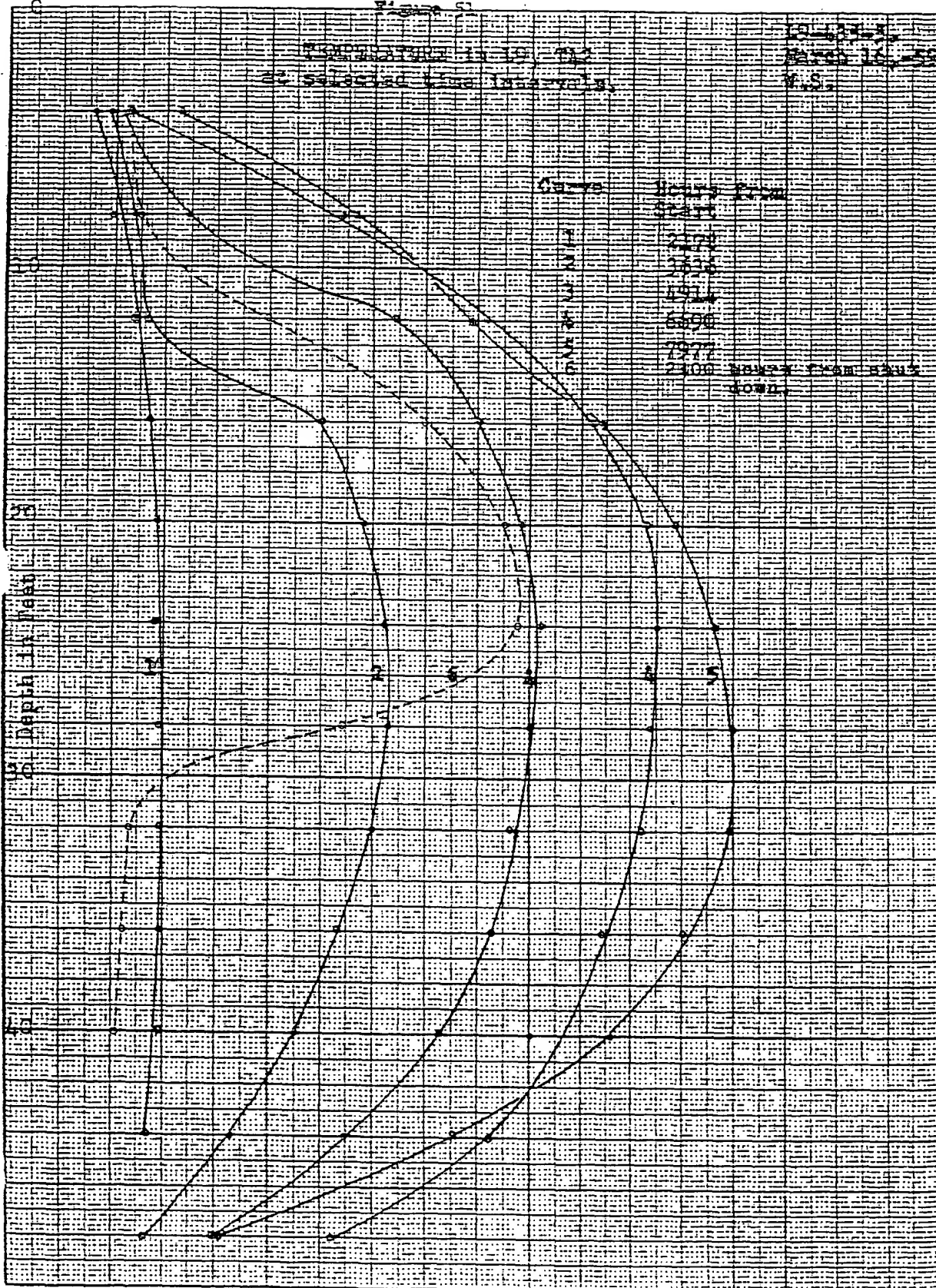


Figure 52

TEMPERATURE IN °F. AT
at selected time intervals

IS-35-6
March 14, 50
W.B.

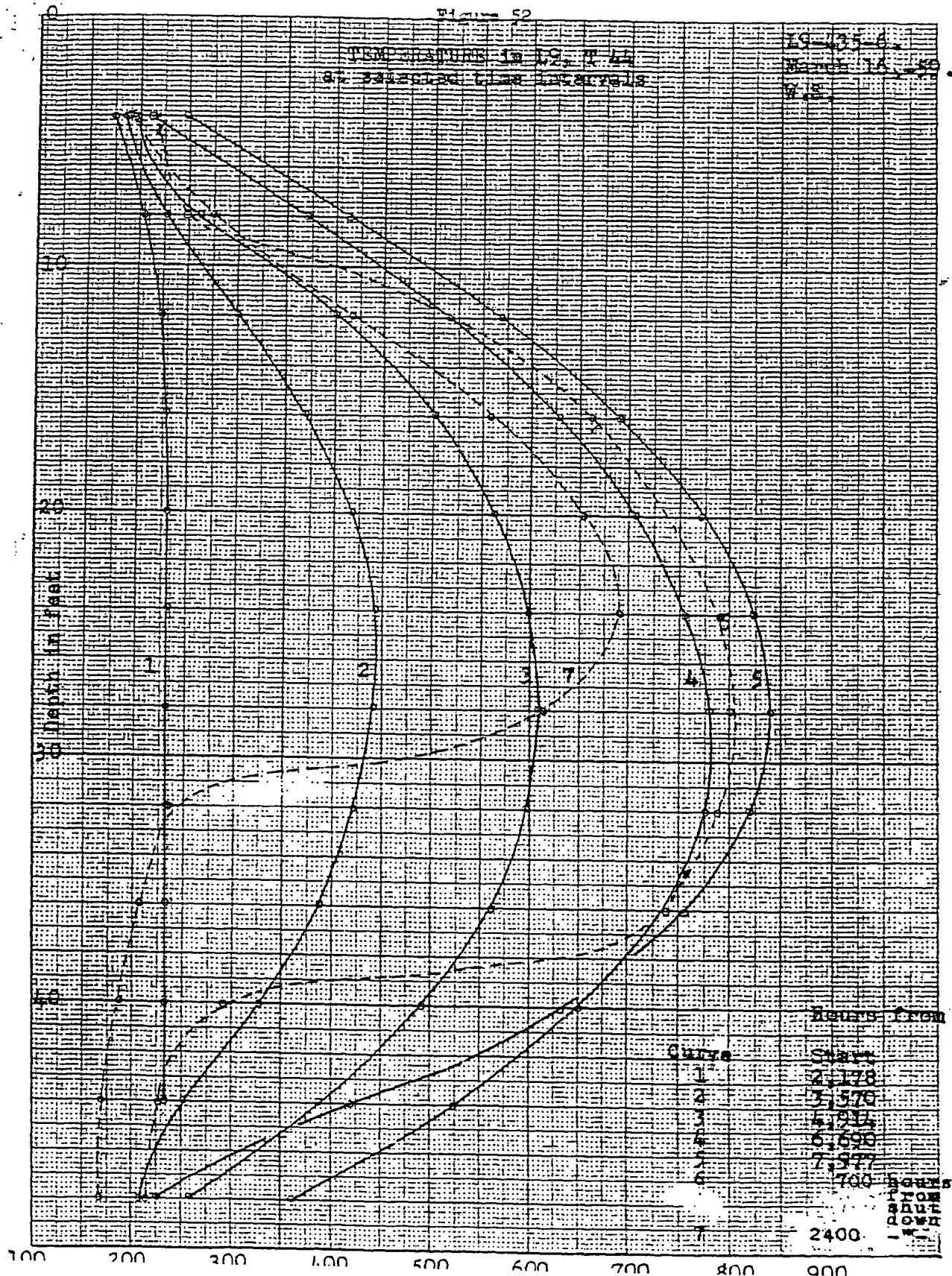
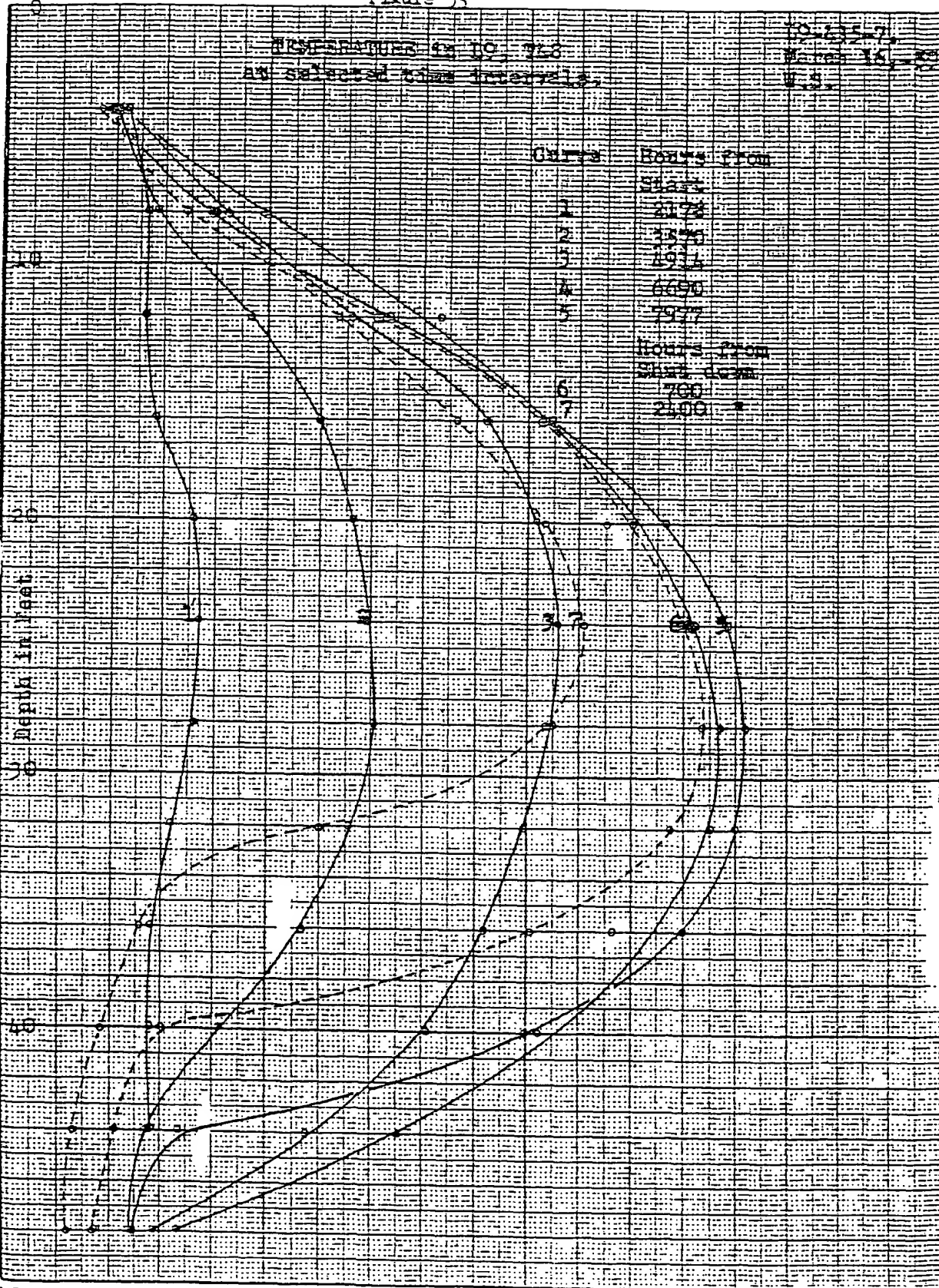


Figure 53

TEMPERATURE IN 10° FLS
AT selected time intervals.

10-15-71
St. John, N.H.
U.S.

| Curve | Hours from Start |
|-------|---------------------------------|
| 1 | 2178 |
| 2 | 2345 |
| 3 | 2511 |
| 4 | 2690 |
| 5 | 2877 |
| 6 | Hours from Start from 700 |
| 7 | 2100 |



7100-7
TEMPERATURE in 12, 7100
at selected time intervals.

19-525-2
March 16, -59
W.S.

| Curve | Hours from Start |
|-------|--------------------------|
| 1 | 2178 |
| 2 | 3570 |
| 3 | 4931 |
| 4 | 6300 |
| 5 | 7917 |
| 6 | Hours from Start 7000 |

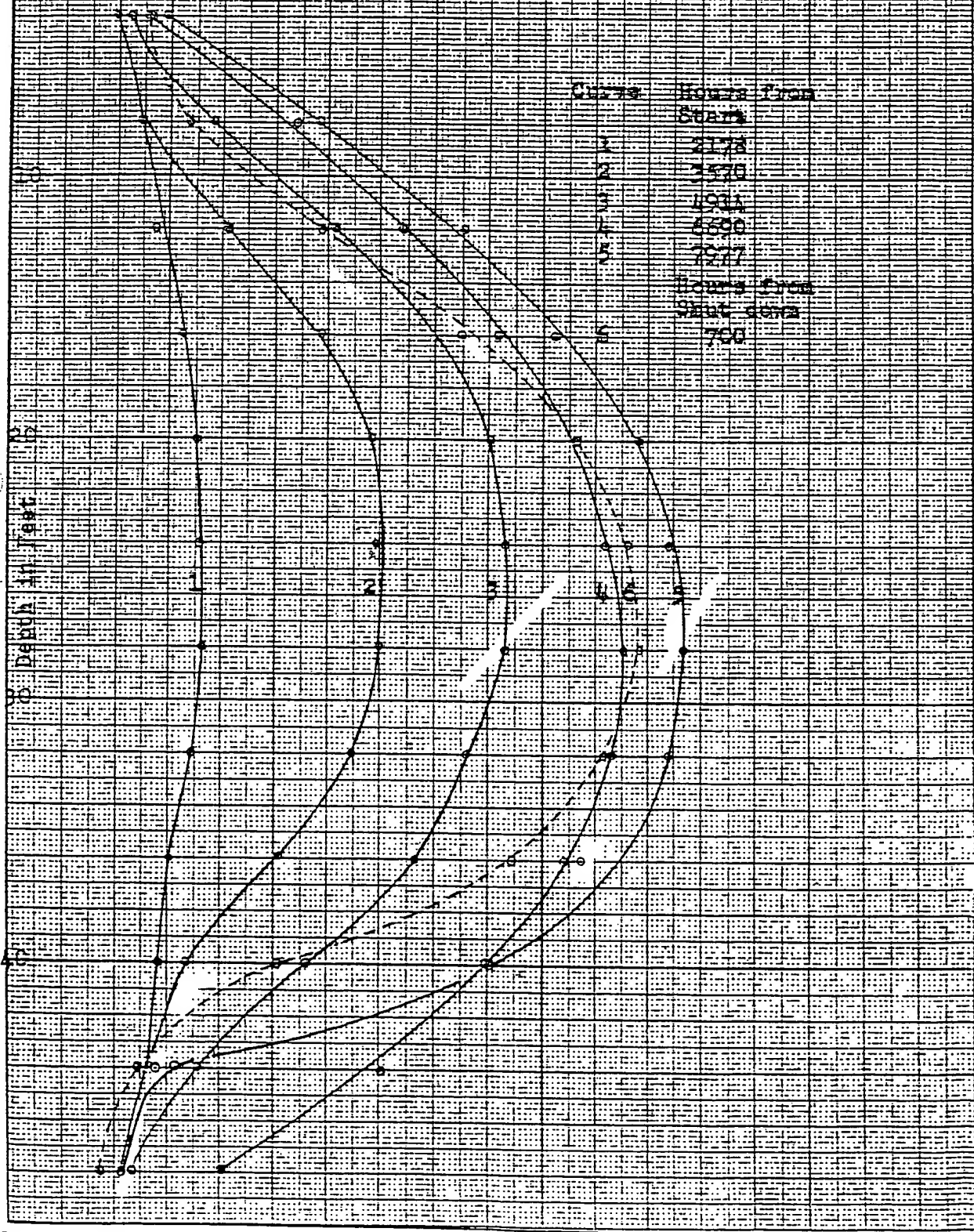


Figure 55

STATIONARY IN 19, 2403
at selected time intervals.

19-03-9.
March 16, 35.
W.S.

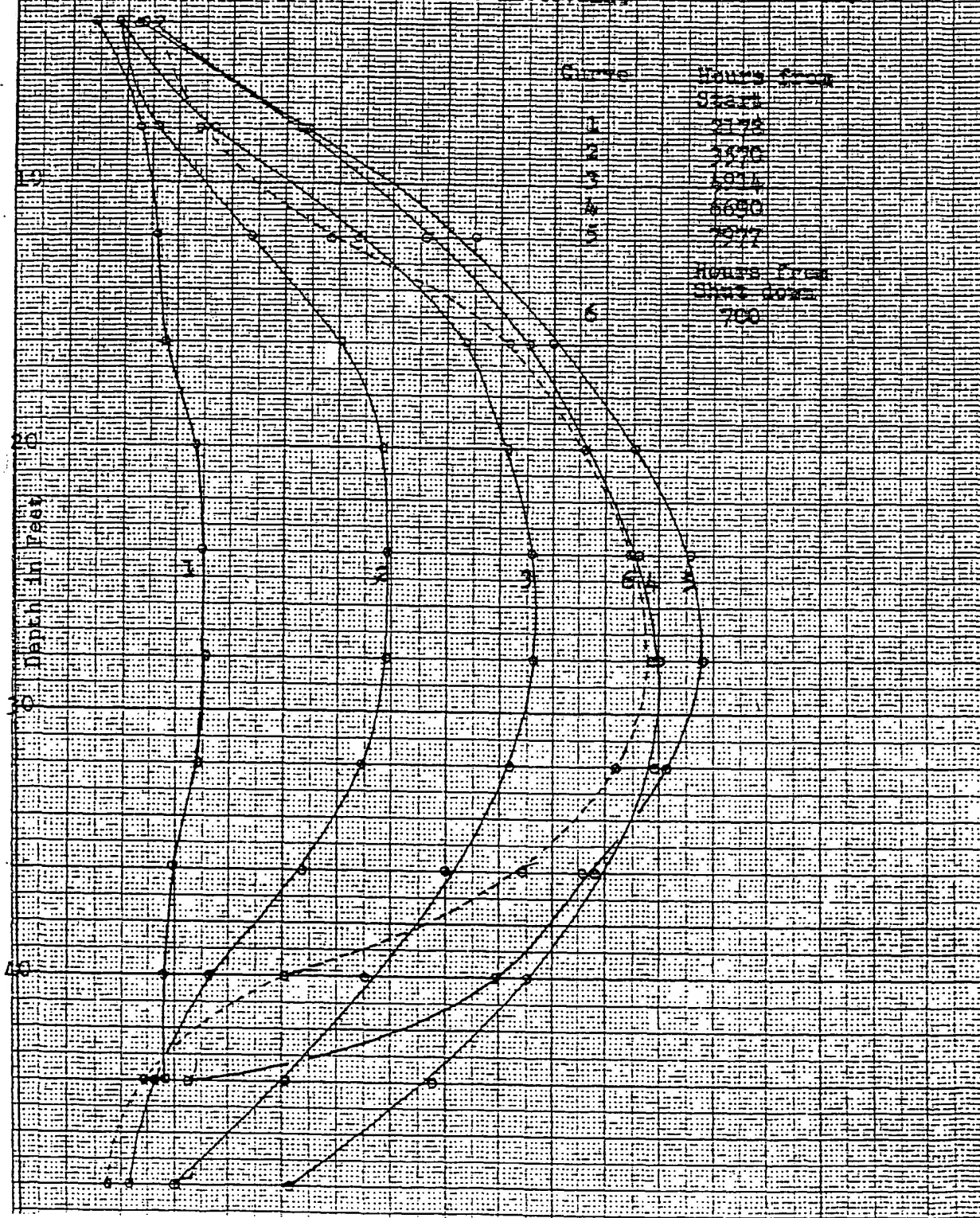
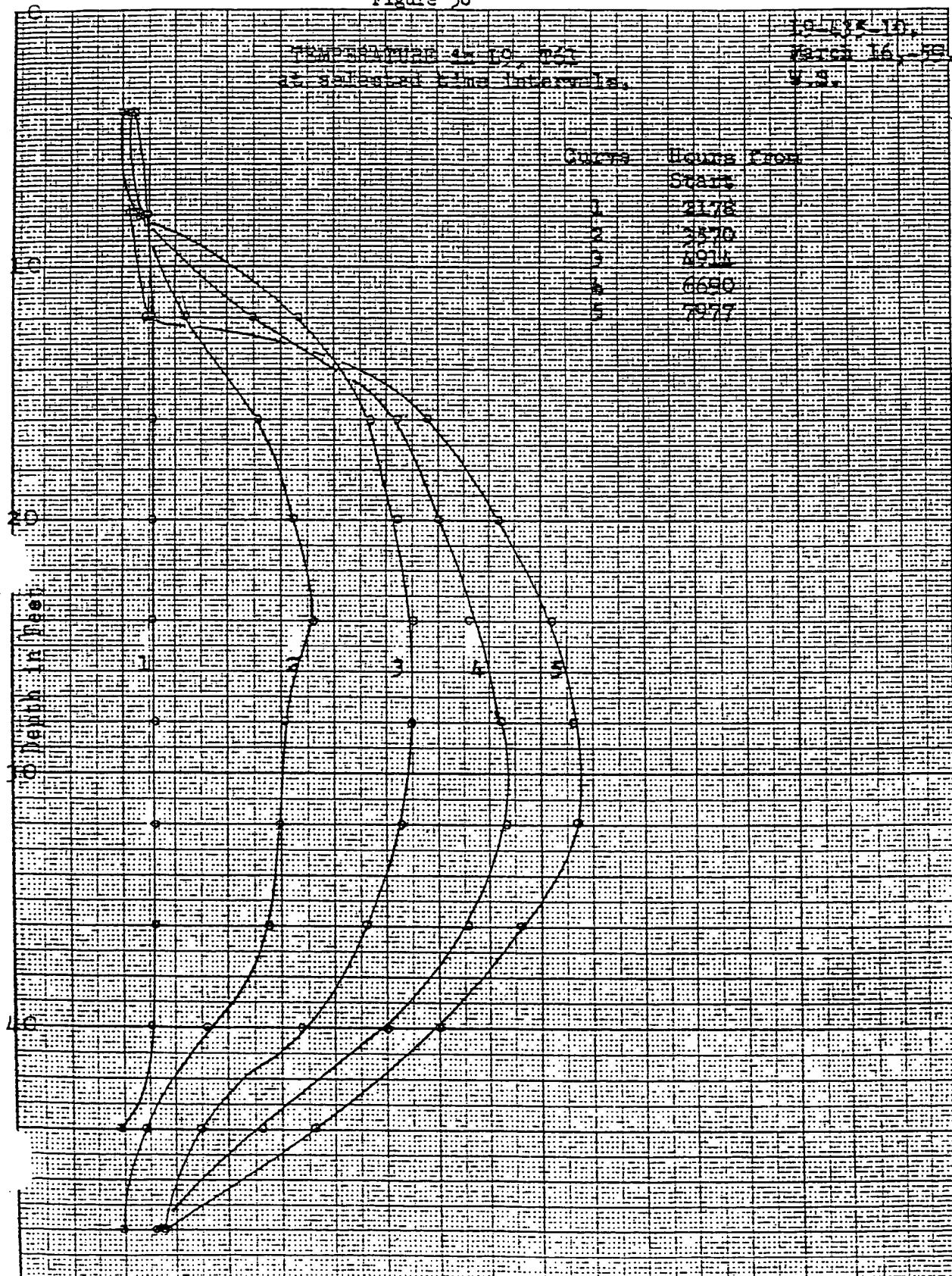


Figure 56

TEMPERATURE IN °C
at various time intervals.

10-17K-10.
March 16, 1958
U.S.



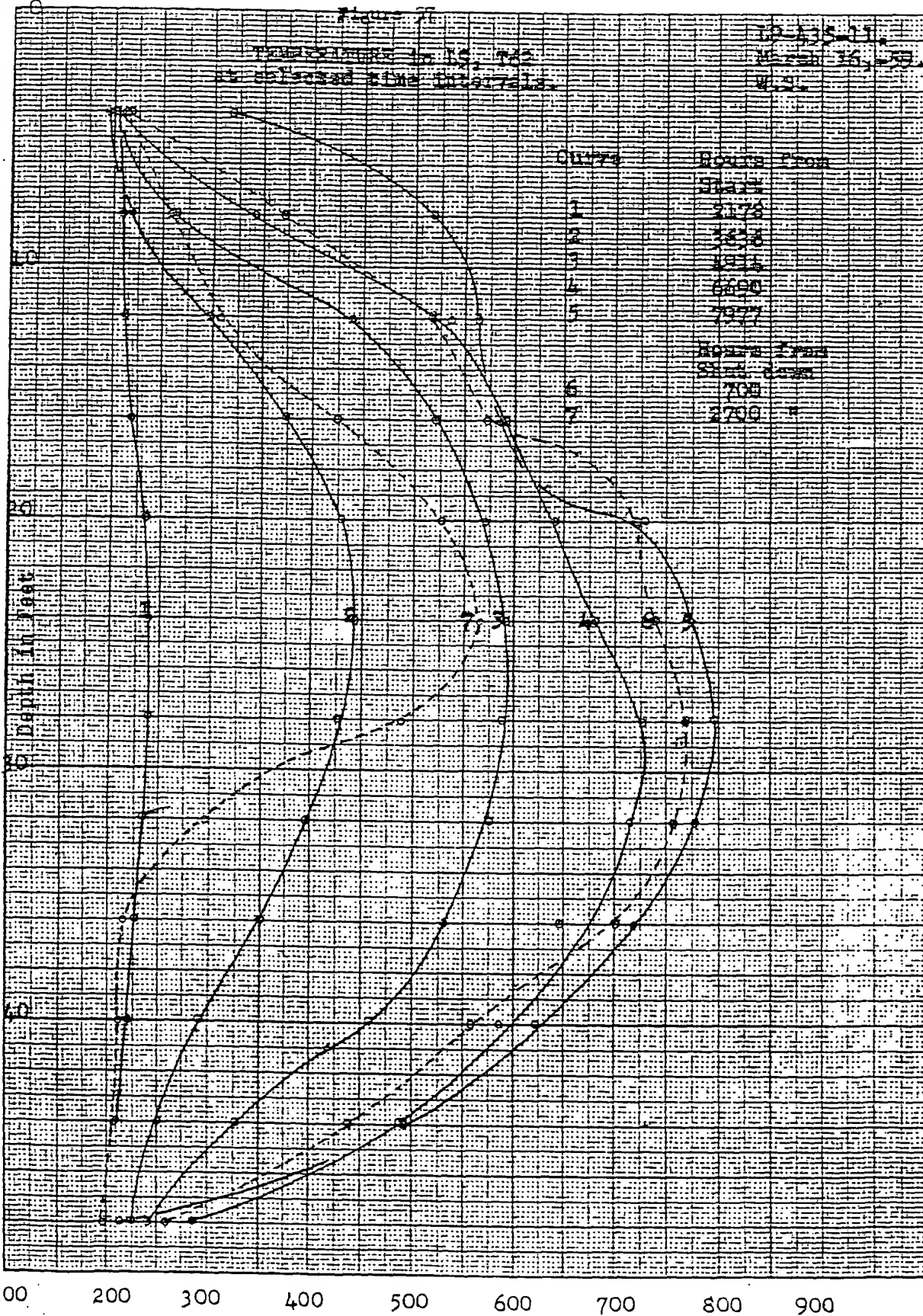


Figure 58

TEMPERATURES IN °F
at selected time intervals.

19-55-12
March 18, 1956
W.S.

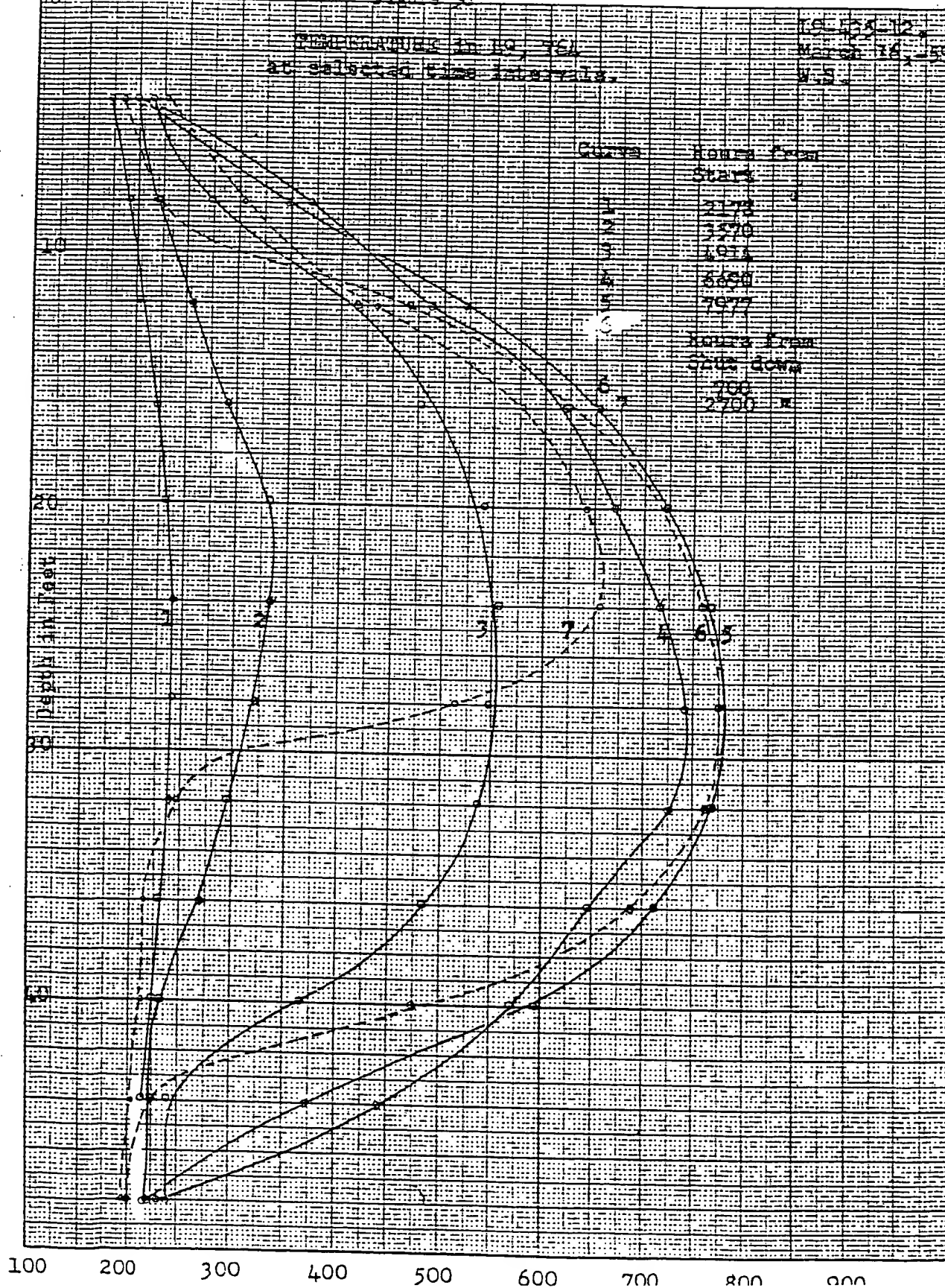


Figure 59

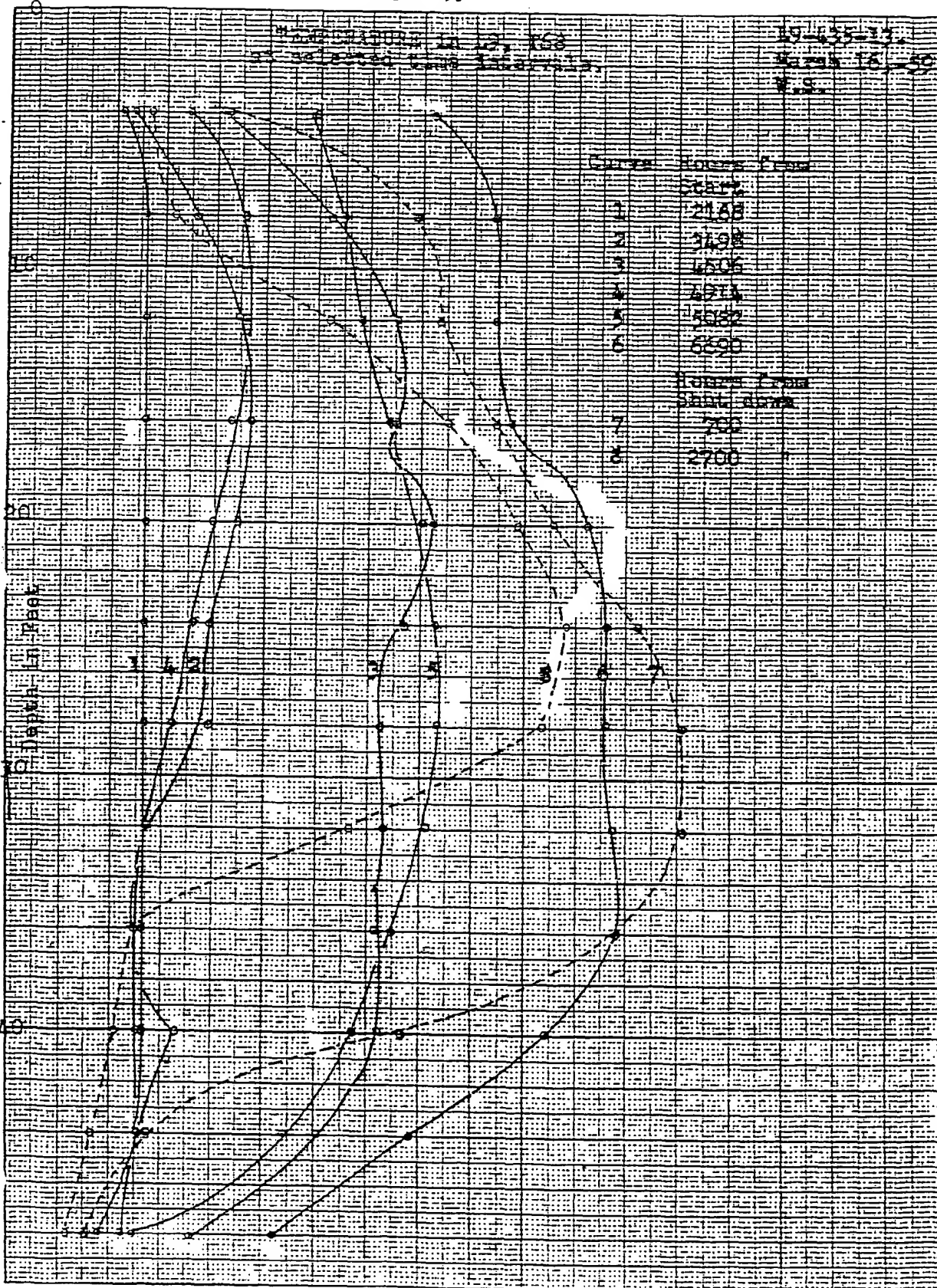


Figure 60

TEMPERATURE IN 10' TWT
at selected time intervals.

CS-477-1A
March 16, 1960
W.S.

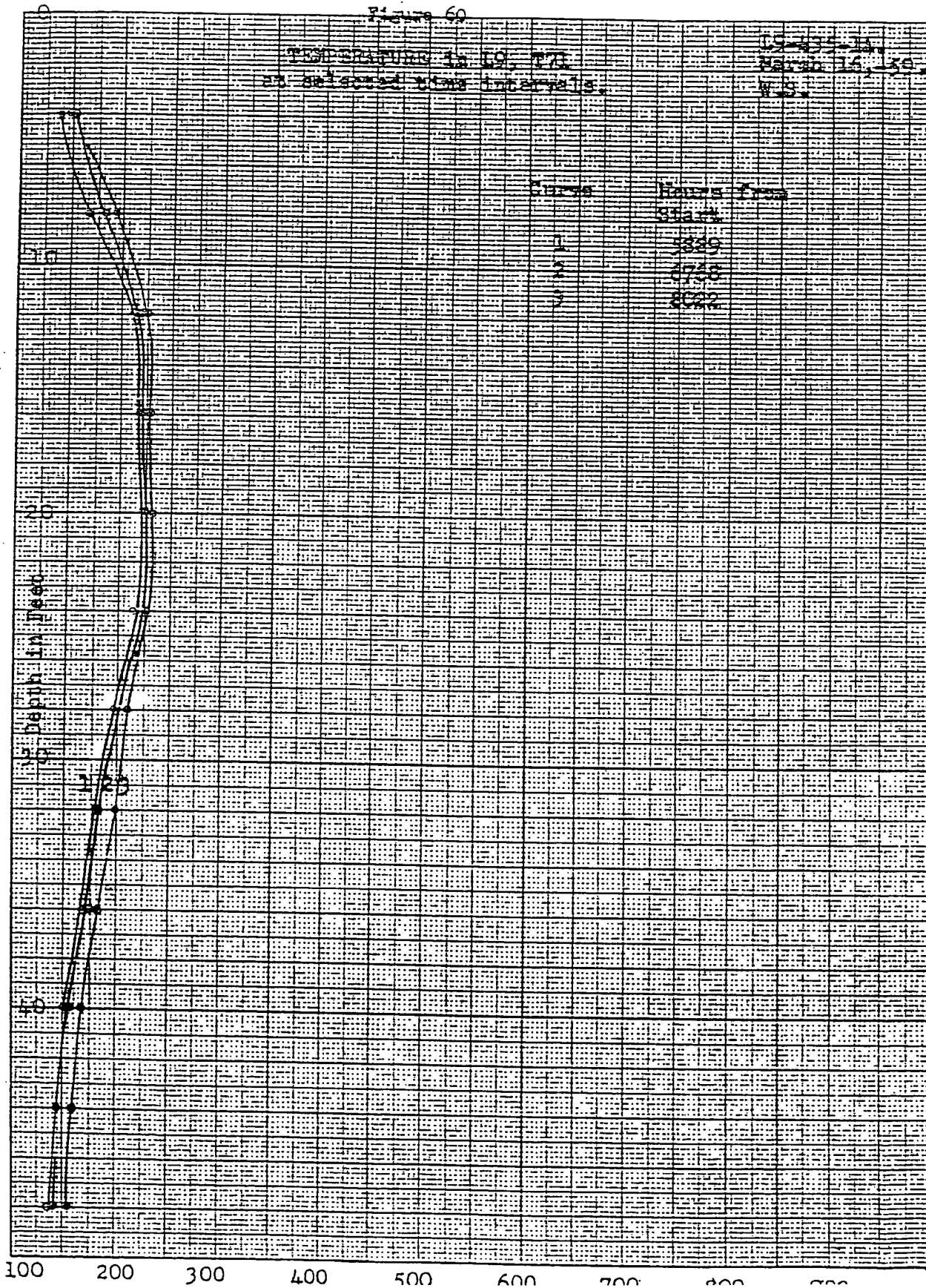


Figure 61

TEMPERATURE IN LG, P710A
at selected time intervals.

10-13-15
March 10, 1955
F.S.

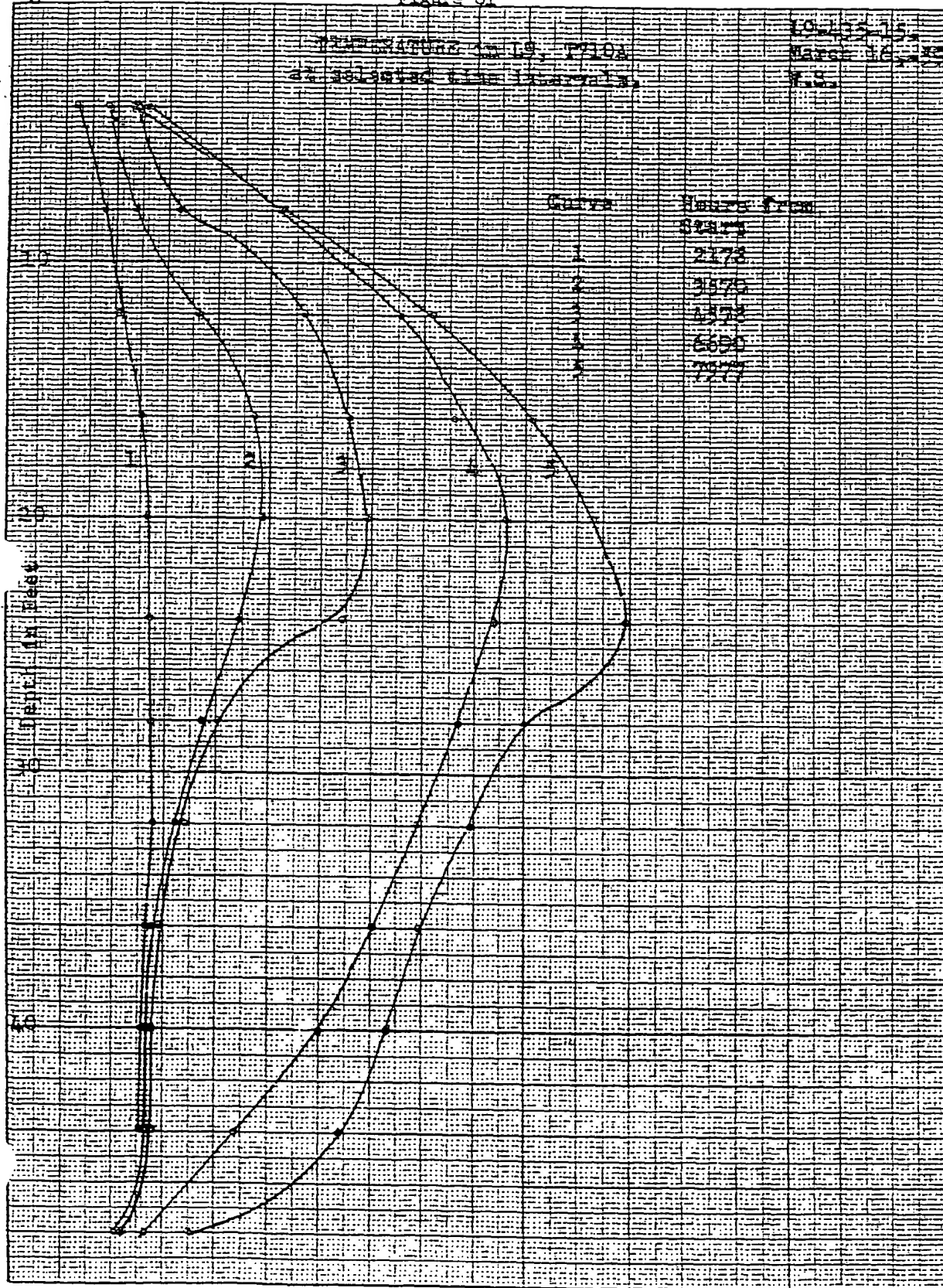


Figure 62

TEMPERATURE in $^{\circ}\text{C}$, $^{\circ}\text{F}$
at selected time intervals

Chart 15
Sigsbee 16-50
U.S.

Curve

Hours from
Start

- 1 2178
- 2 2570
- 3 4314
- 4 5020
- 5 7977
- 6 2720 hours from
start down

Depth in Feet

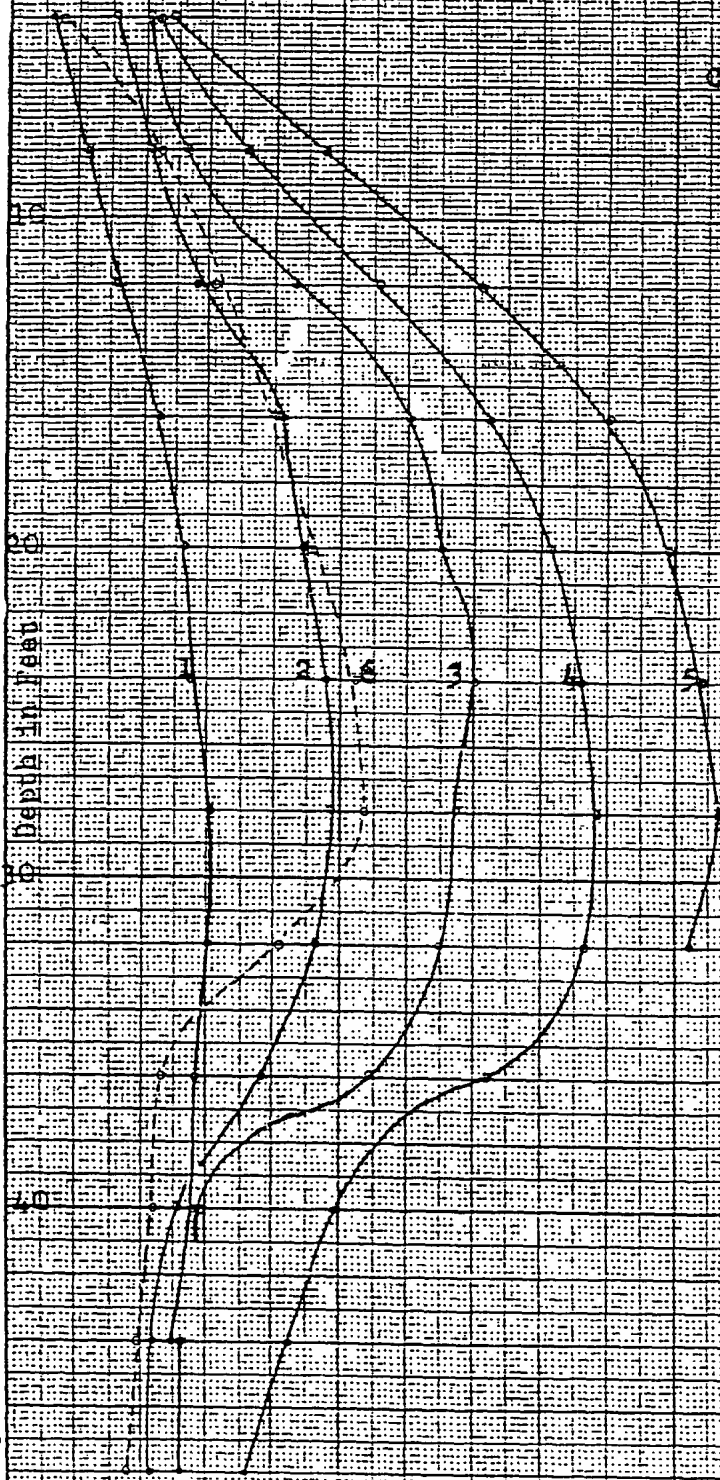


Figure 63

Temperature in °C, 87100
at selected time intervals.

63-103-27
March 11, 1959
N.S.

| Curve | Bottom Area Chart |
|-------|----------------------|
| 1 | 5885 |
| 2 | 6762 |
| 3 | 8022 |

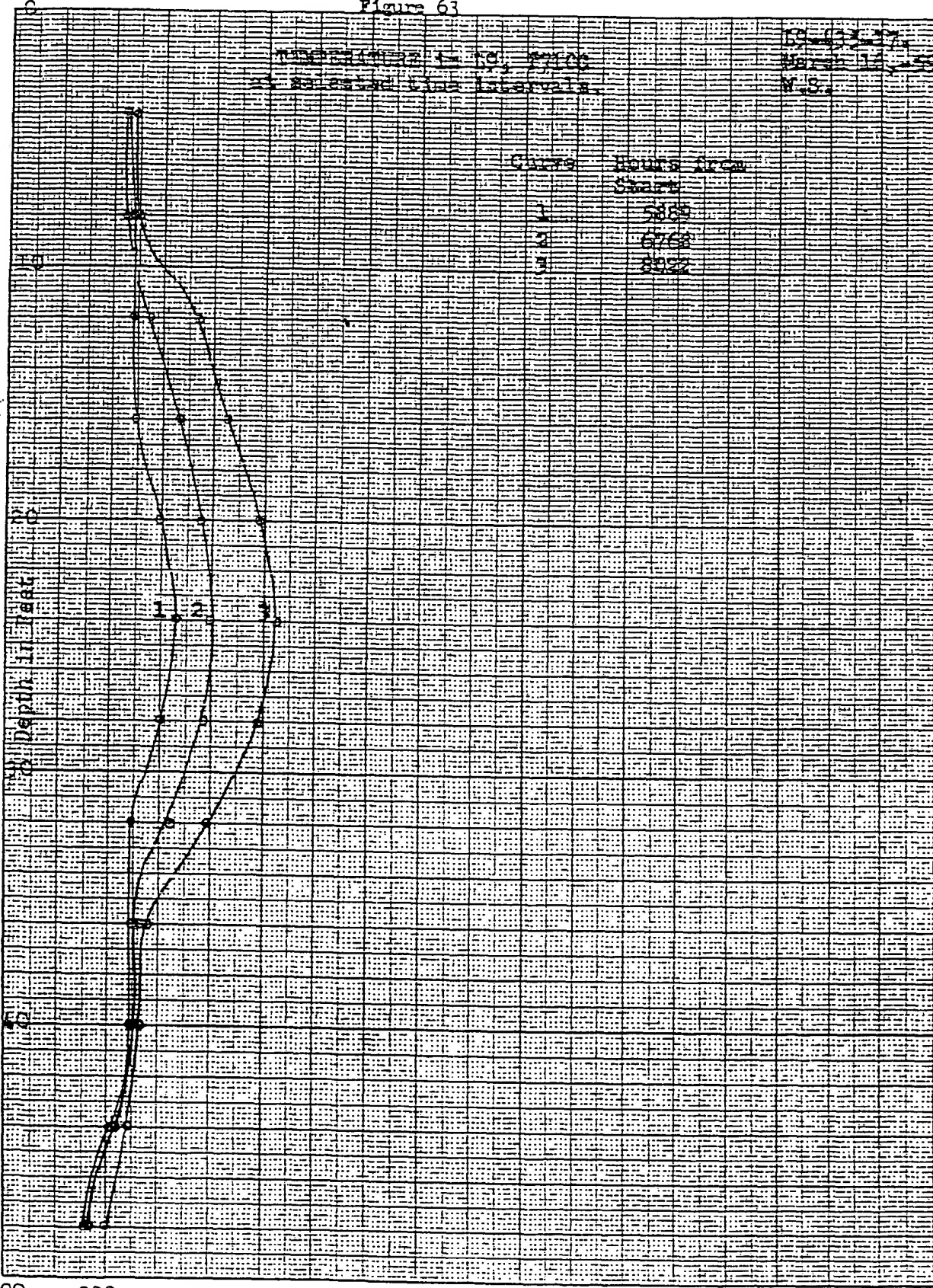


FIGURE 63

Figure 4
 TEMPERATURE IN °C, °F
 at selected time intervals

10-135-18
 March 16, 1964
 U.S.

| Curve | Hours From |
|-------|------------|
| | Start |
| 1 | 2143 |
| 2 | 3570 |
| 3 | 4914 |
| 4 | 6600 |
| 5 | 7977 |
| | Hours From |
| | Start down |
| 6 | 700 |
| 7 | 2700 |

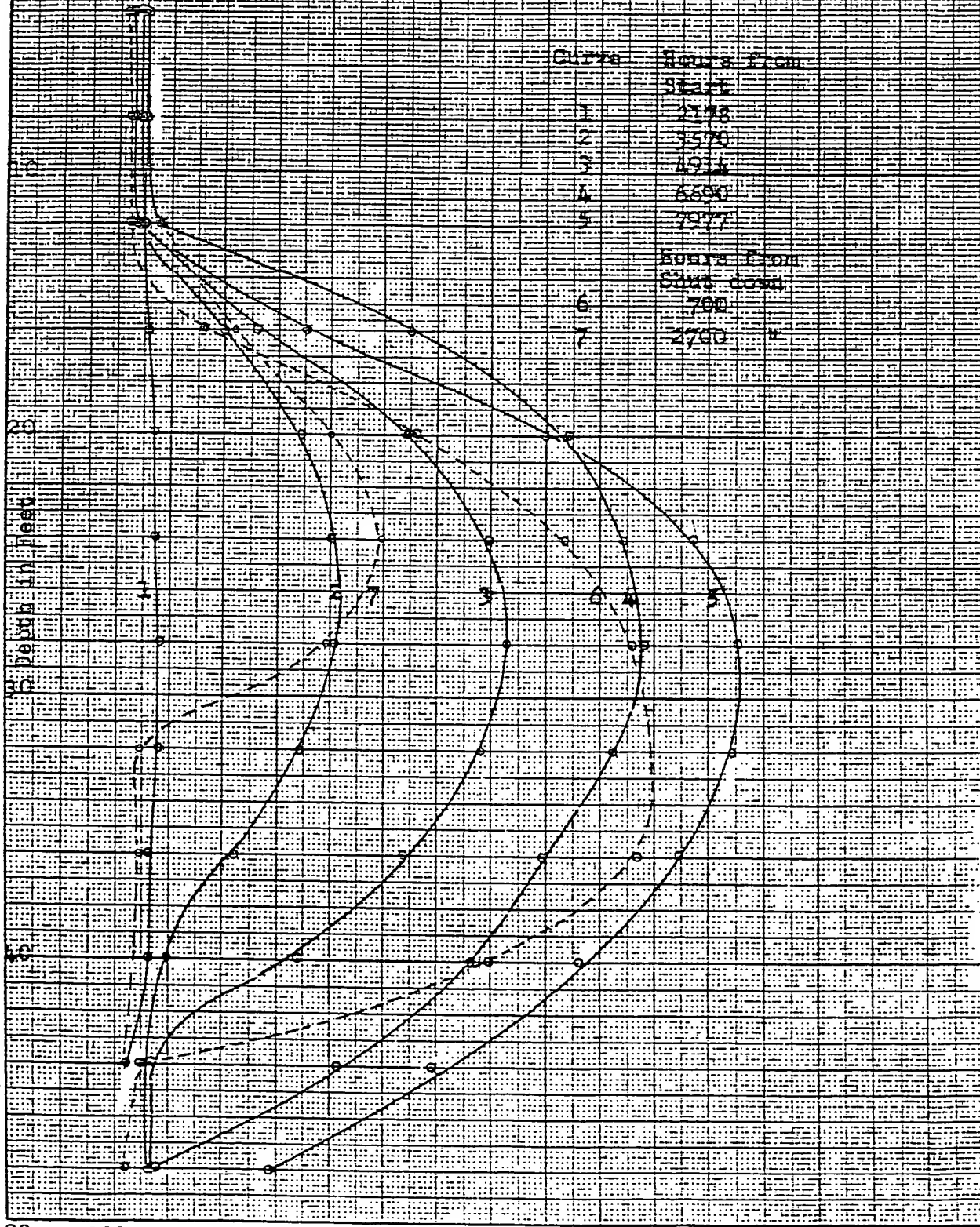


Figure 62
 TEMPERATURE in °C, °F
 at selected time intervals

0-1000 ft
 March 16, 50
 8.2

| Curve | Hours from Start |
|-------|--------------------------|
| 1 | 2175 |
| 2 | 3570 |
| 3 | 4975 |
| 4 | 6690 |
| 5 | 7977 |
| 6 | Hours from Start down |
| 7 | 700 |
| 8 | 2700 |

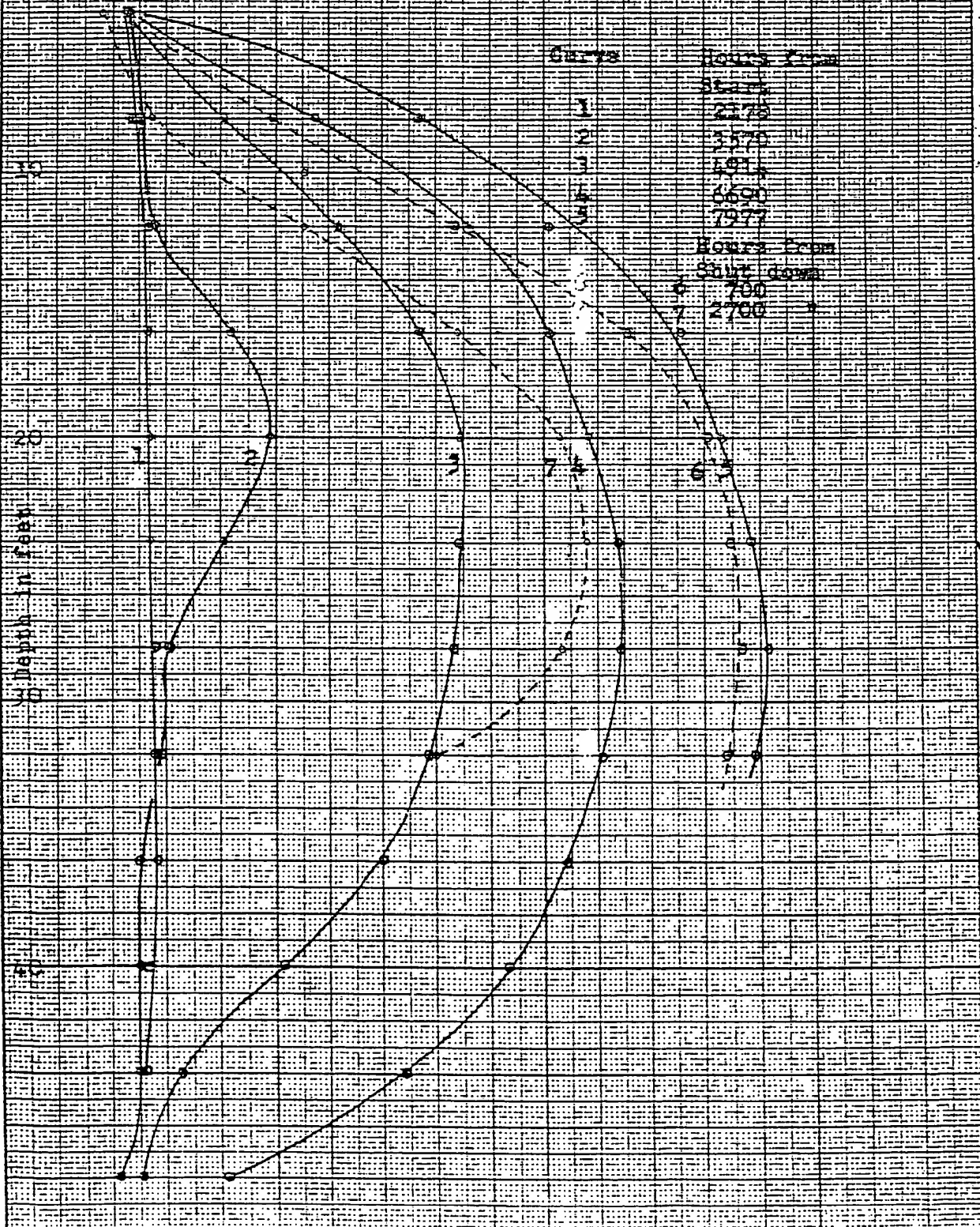
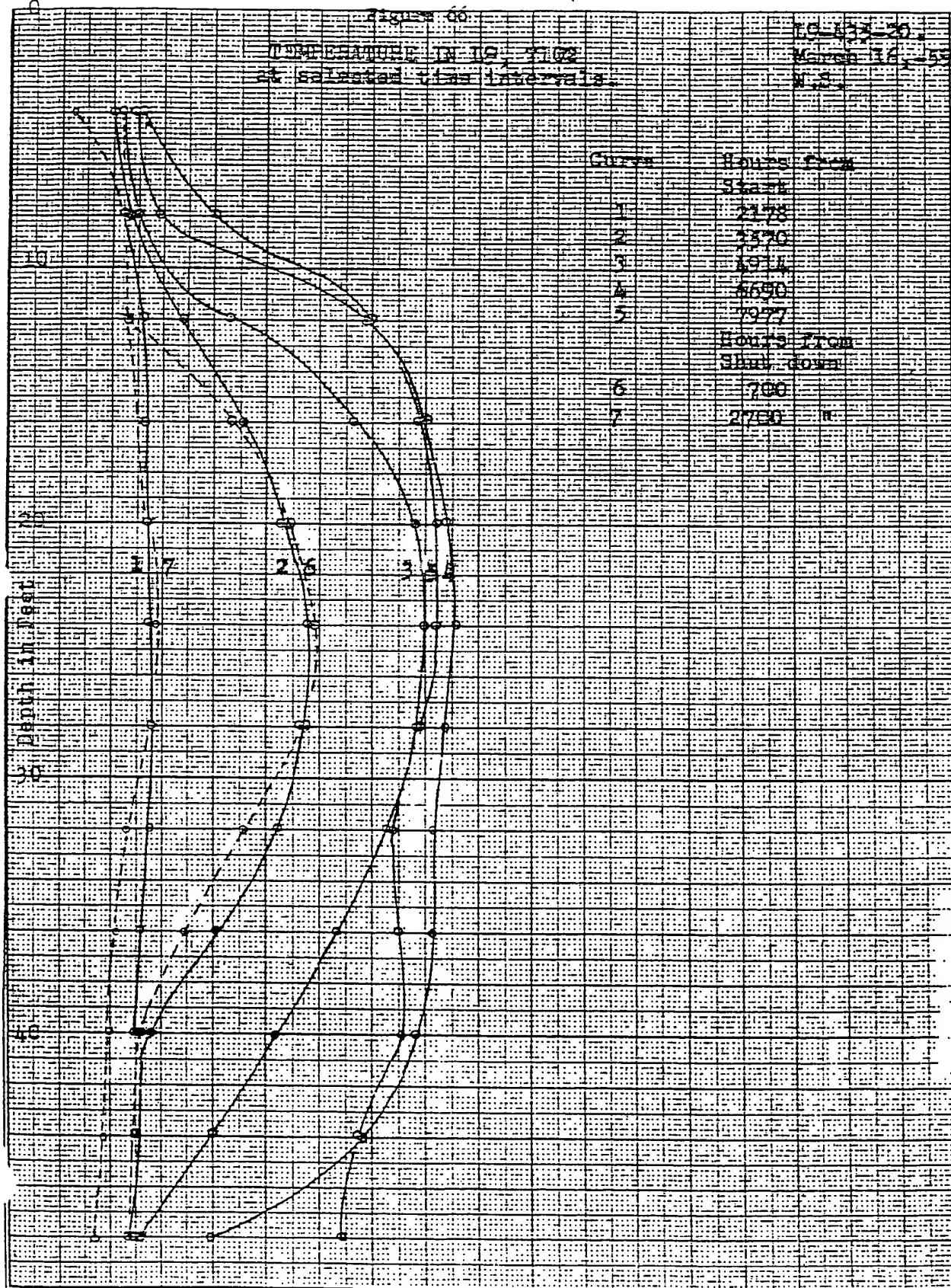


Figure 66
TEMPERATURE IN IQ, F102
at selected time intervals.

IC-433-20
March 14, 50
W.S.



Station 67
 Tides plotted in 10' increments
 at selected time intervals

15-135-27
 March 16, -59
 W.S.

| Curve | Height From |
|-------|-------------|
| | Station |
| 1 | 5758 |
| 2 | 6768 |
| 3 | 8022 |

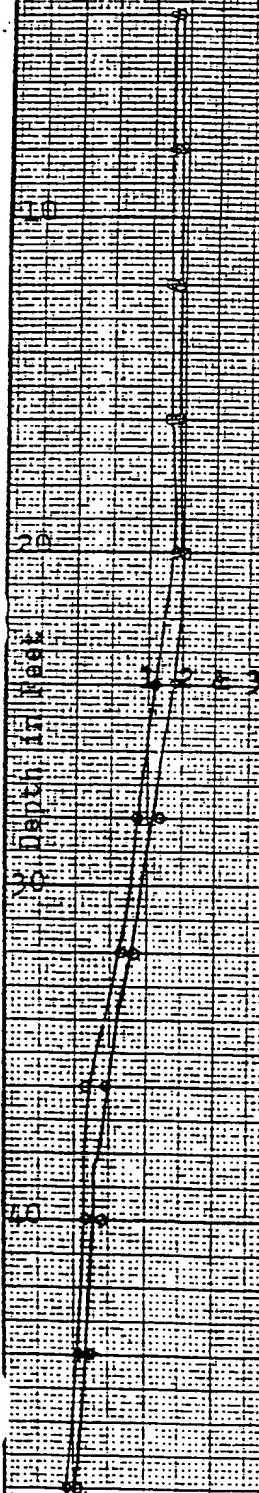
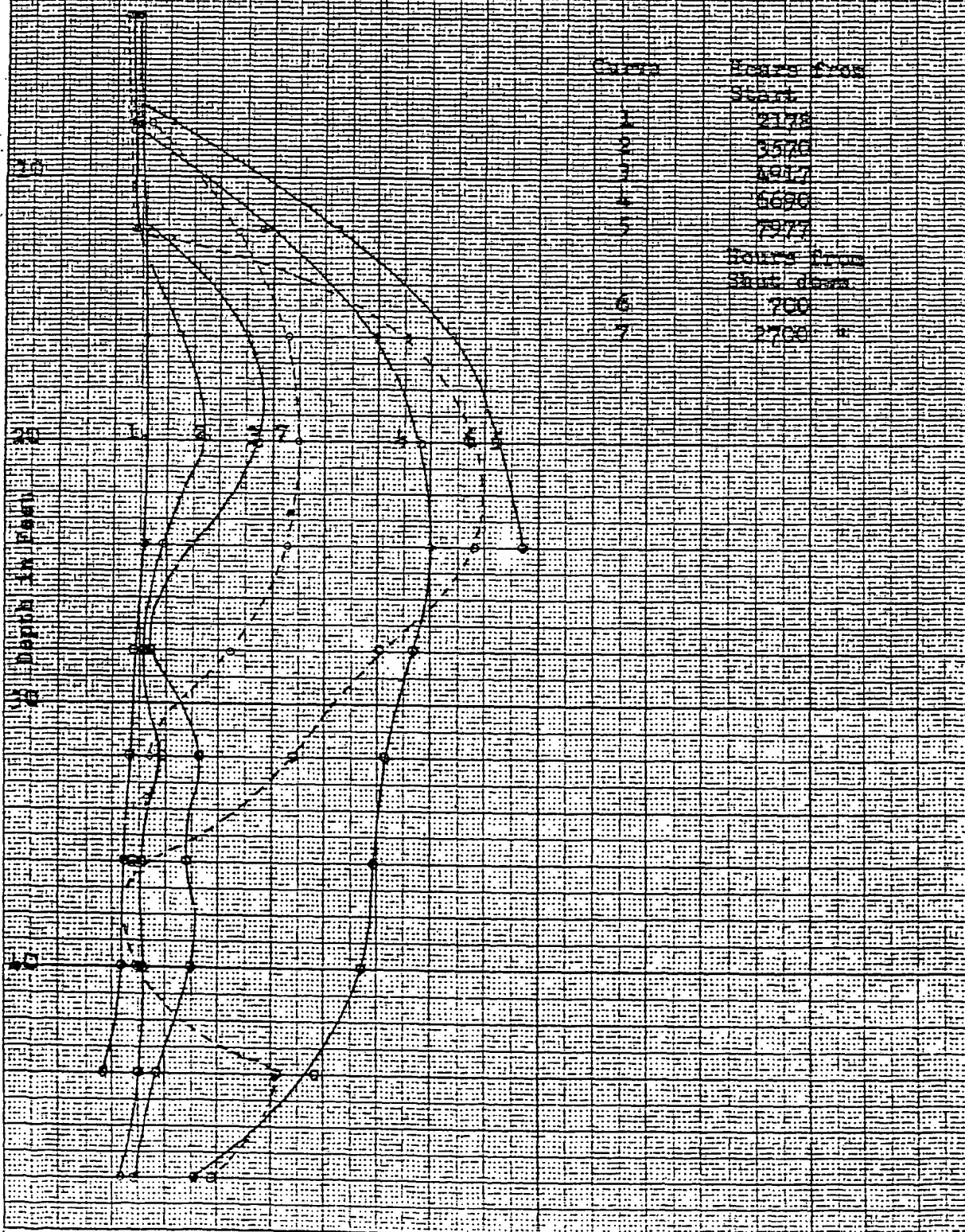


Figure 62
TEMPERATURE IN °C, ONCE
at selected time intervals.

FD-123-25-1
March 16, 1950
U.S.



19.38
19.39

Figure 15

TEMPERATURE IN 19. 1922

At 12, 23, 44 feet and average temp.

between 11 and 22 feet.

DATE TIME SURFACE

| | |
|---|---------|
| 1 | 11 - 12 |
| 2 | 12 |
| 3 | 20 |
| 4 | 24 |

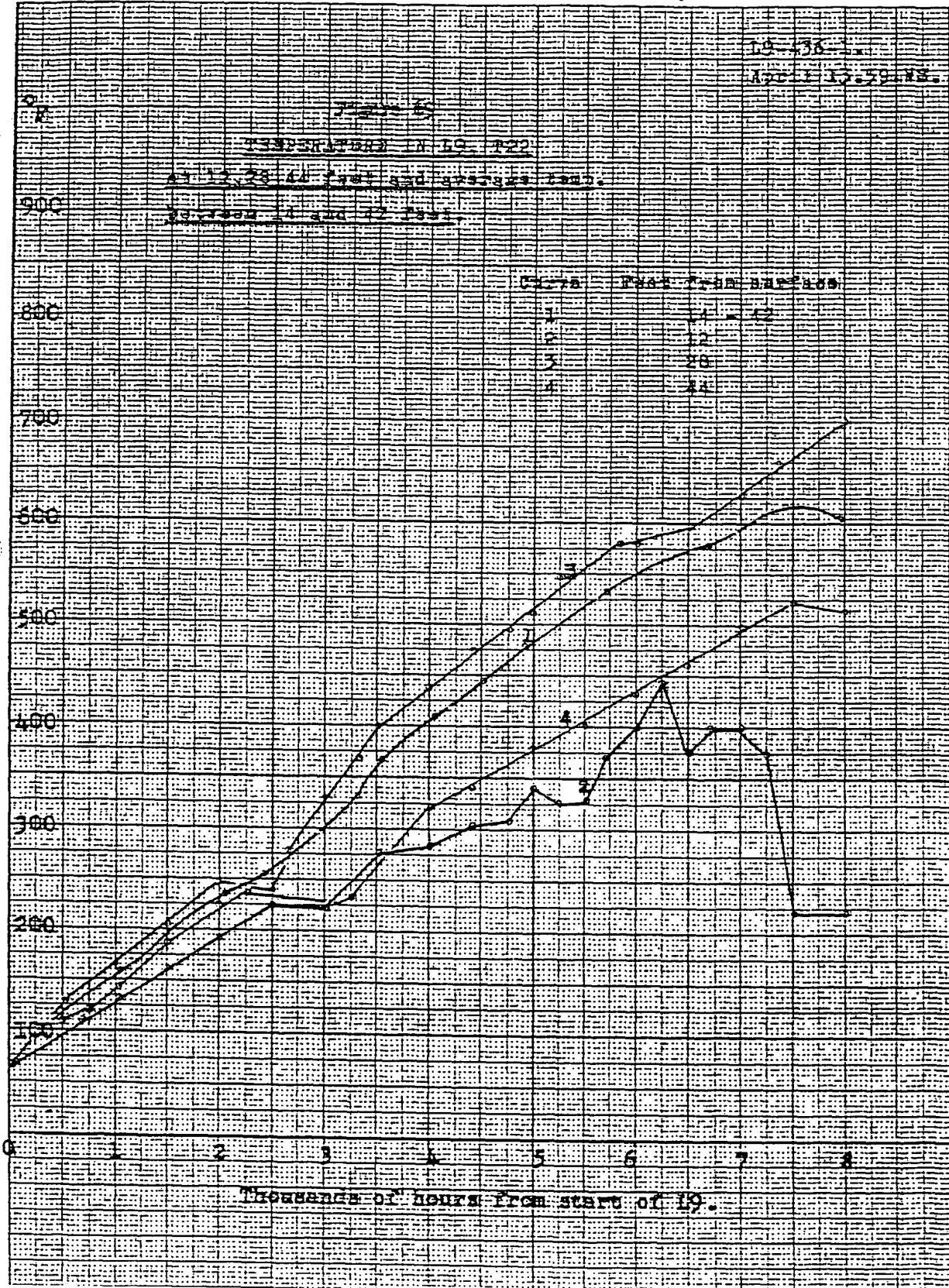


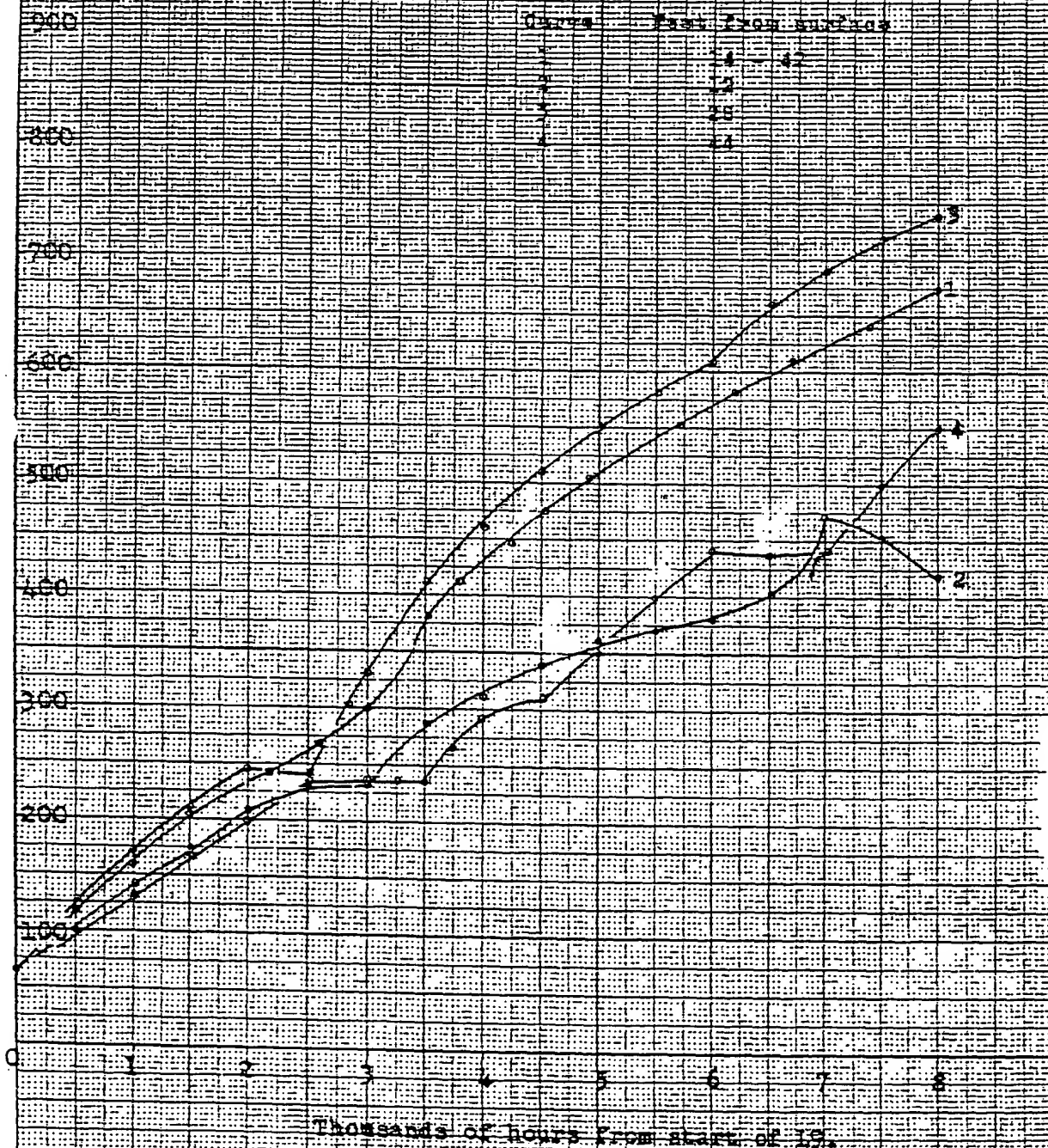
Figure 70

39-475-2

4.13.59.58

TEMPERATURE IN °F AT 12, 28, 44 FEET
AND AVERAGE TEMP. BETWEEN 12 AND 42 FEET

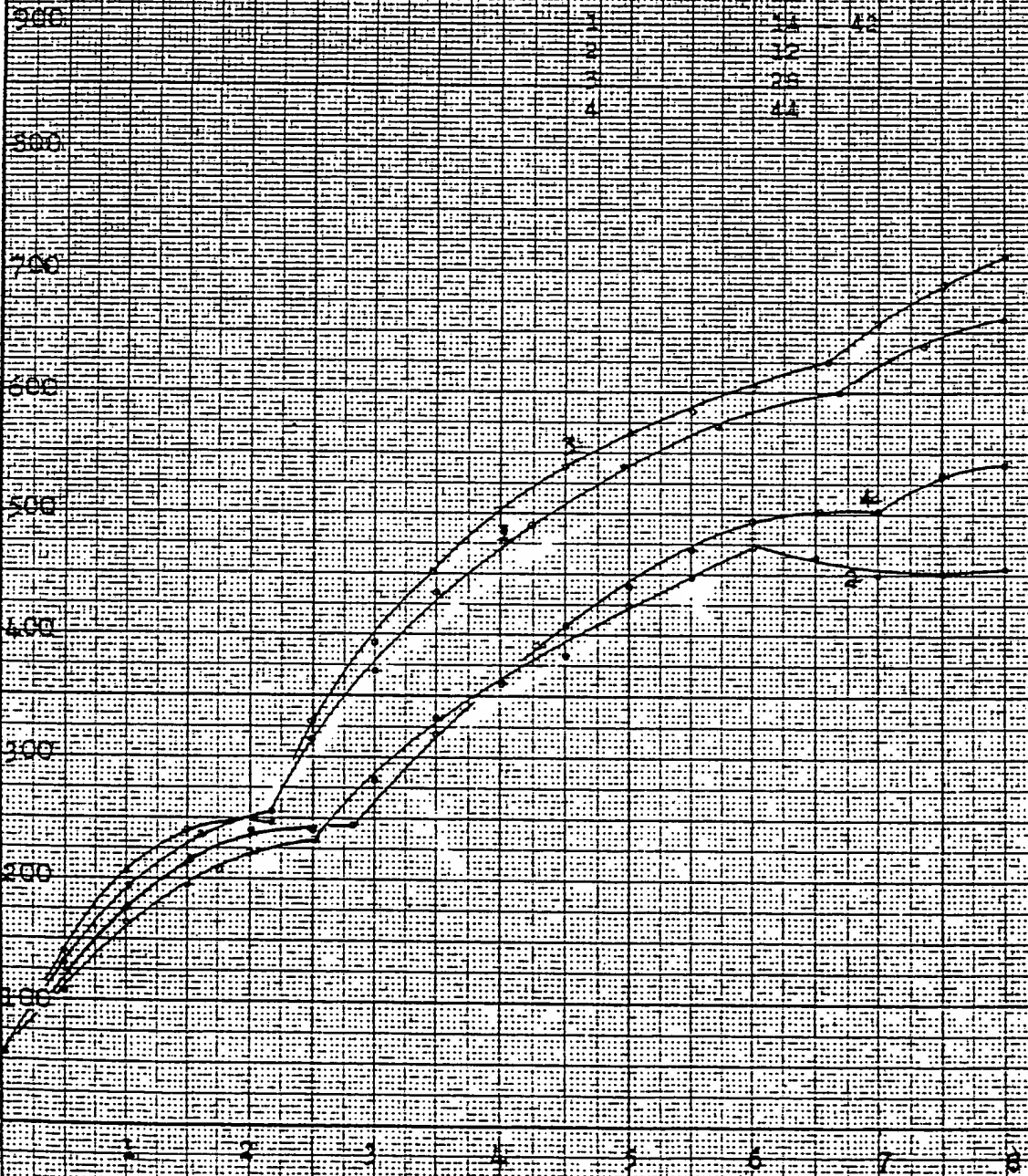
| Curve | Feet From Surface |
|-------|-------------------|
| 1 | 12 |
| 2 | 28 |
| 3 | 44 |
| 4 | Average |



TEMPERATURE IN LG. TUB AT 12, 25, 44 FEET
AND AVERAGE TEMP. BETWEEN 12 AND 44 FEET

10-436-3
4.17.59-48.

| CURVE | FEET FROM SURFACE |
|-------|-------------------|
| 1 | 12 44 |
| 2 | 12 |
| 3 | 25 |
| 4 | 44 |



Thousands of hours from start of LG.

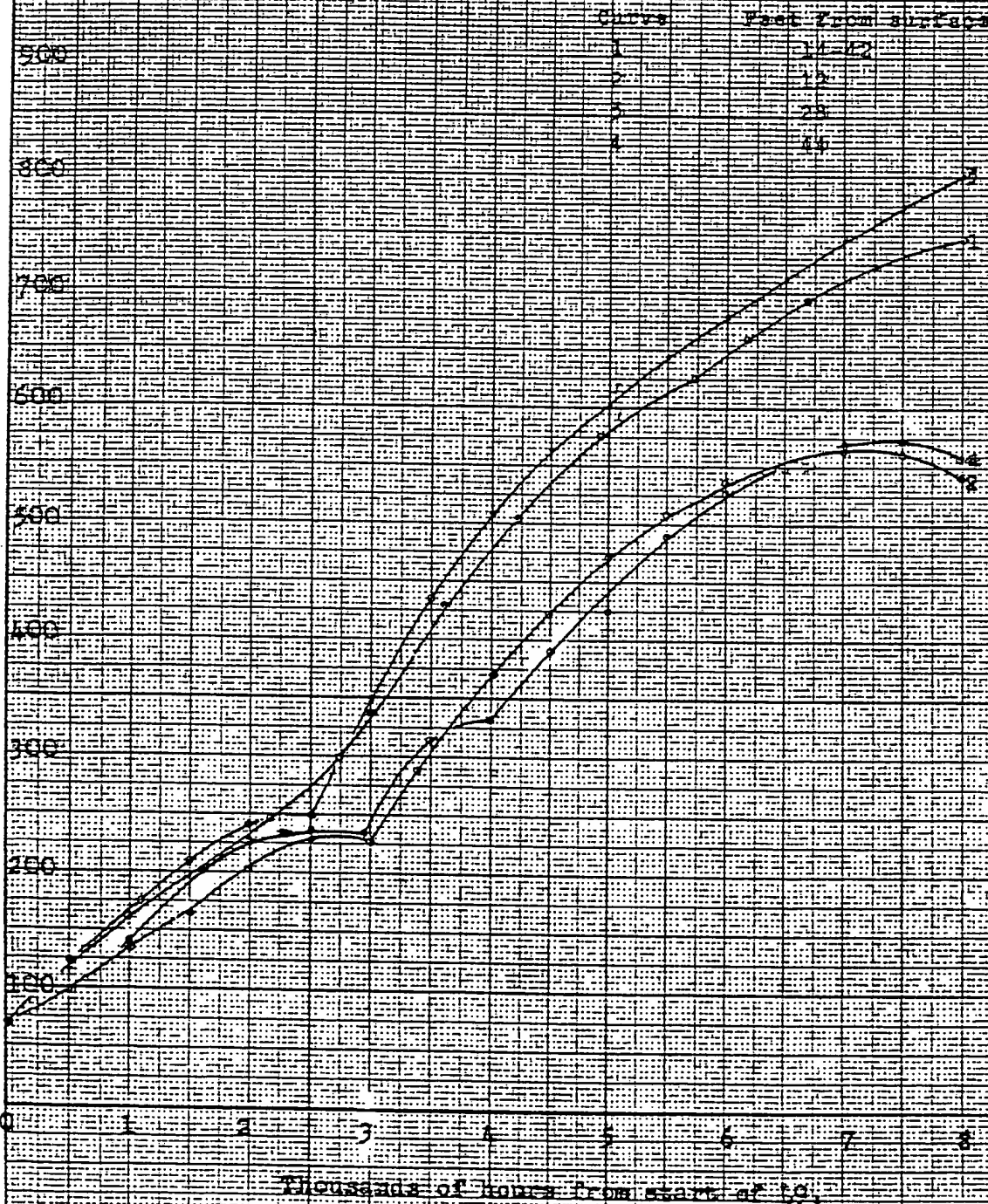
Figure 73

59-436-A

TEMPERATURE IN IR TUB AT 10:28 AM FEET

1.13, 59.93

AND AVERAGE TEMP. BETWEEN 1A AND 12 FEET.



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WILKINSON

Figure 7

45-456-5

4-13-59-22

TEMPERATURE IN °C. AND °F. AT 12, 23, 34 FEET

AT 12 FEET BETWEEN 14 AND 42 FEET

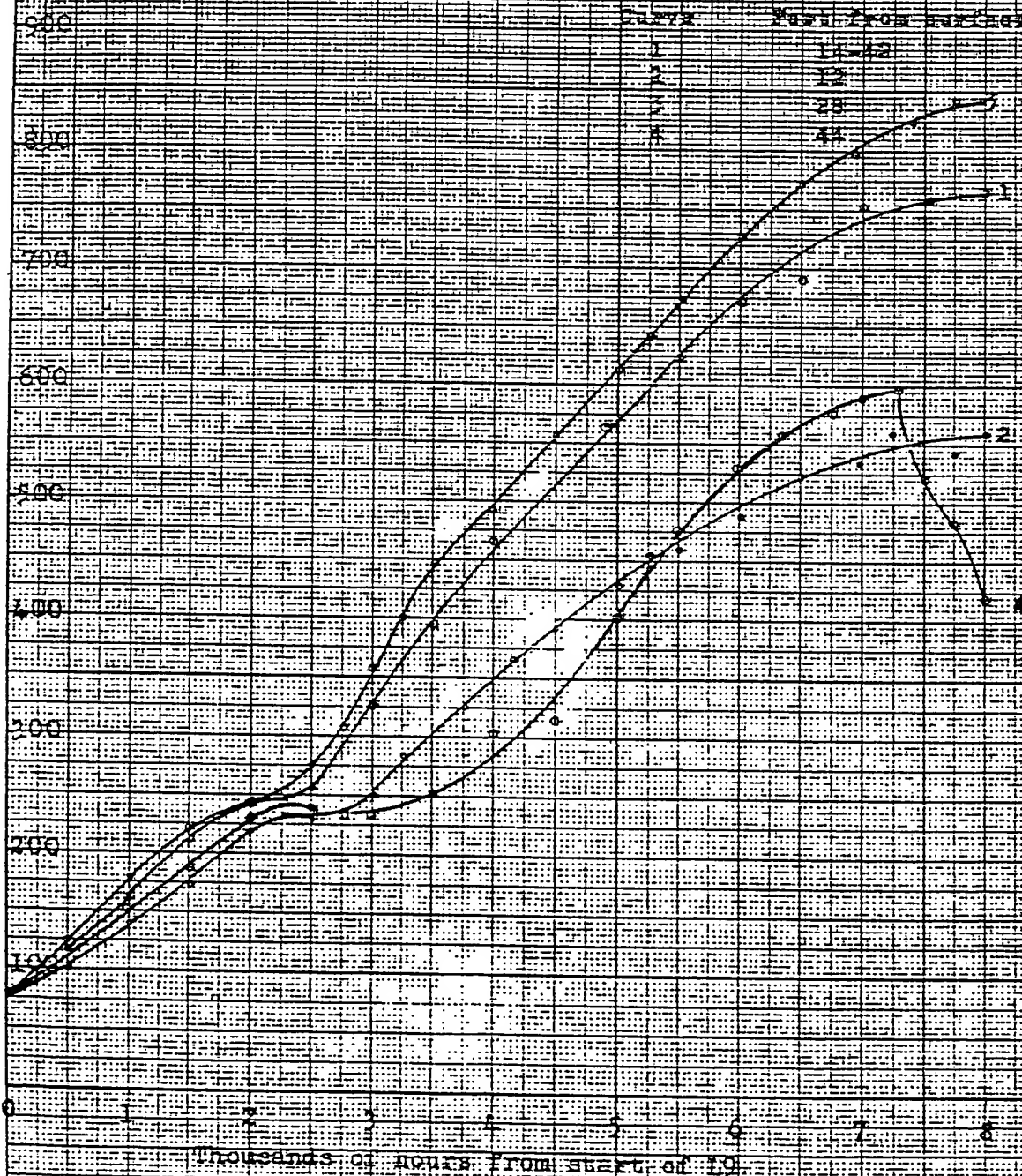


Figure 1A

HS-43E-6.
4.15.59.4E

TEMPERATURE IN DEG. FAE AT 10, 20, 40 FEET
AND AVERAGE TEMP. BETWEEN 10 AND 40 FEET.



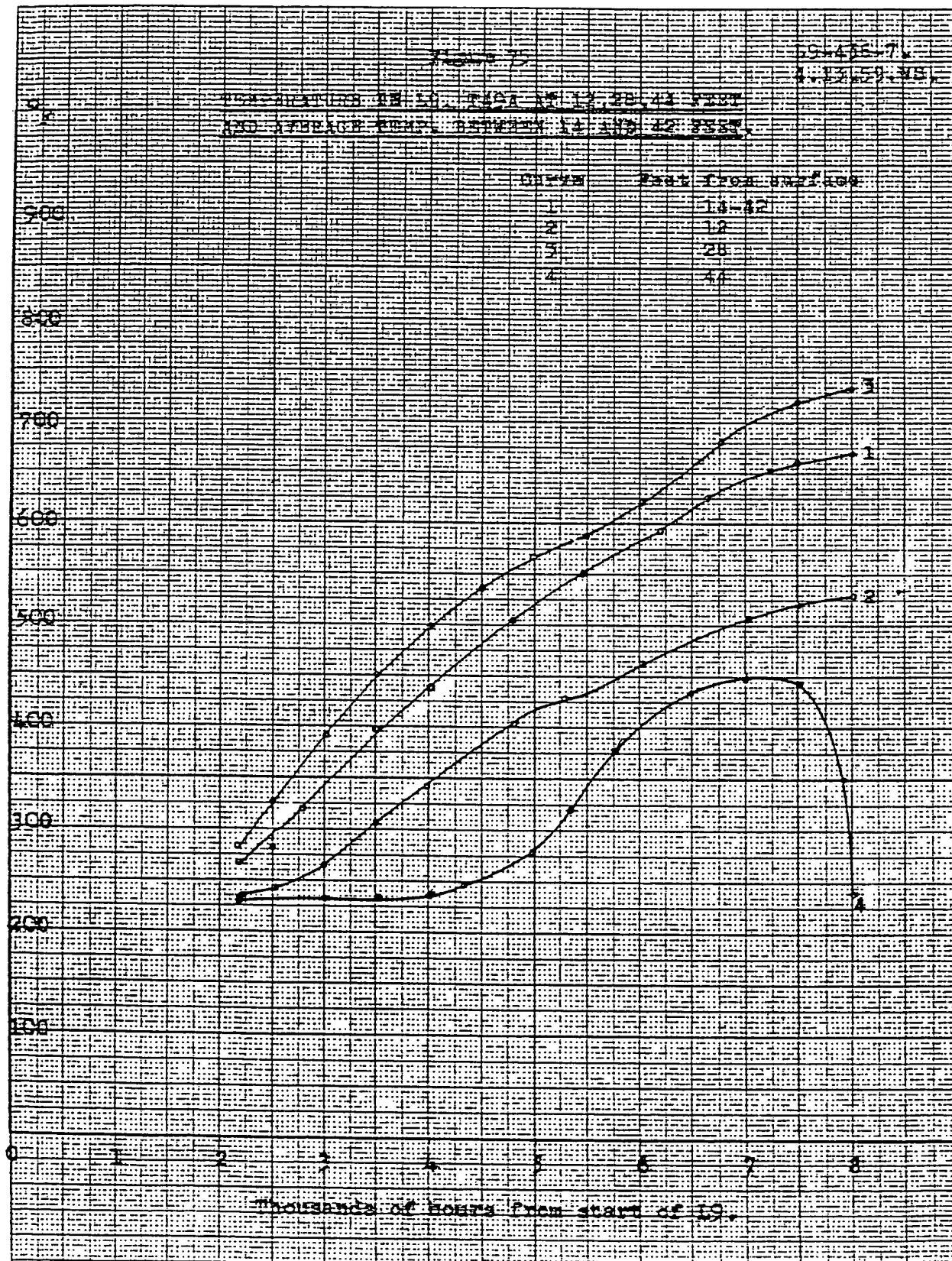


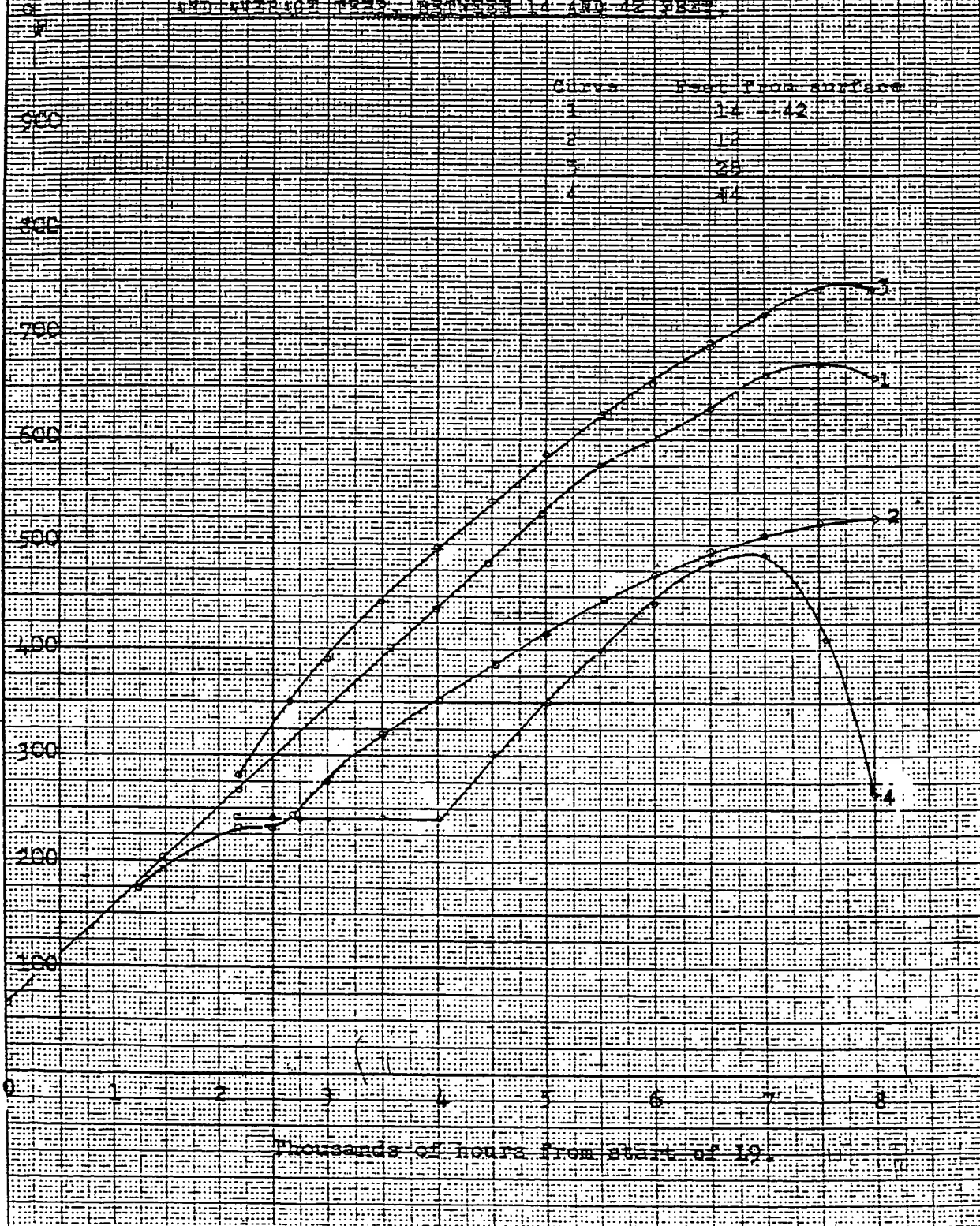
Fig. 76

10-436-2

4-17-59.43.

TEMPERATURE IN 69. T-92 AT 12.28.44 PRESS

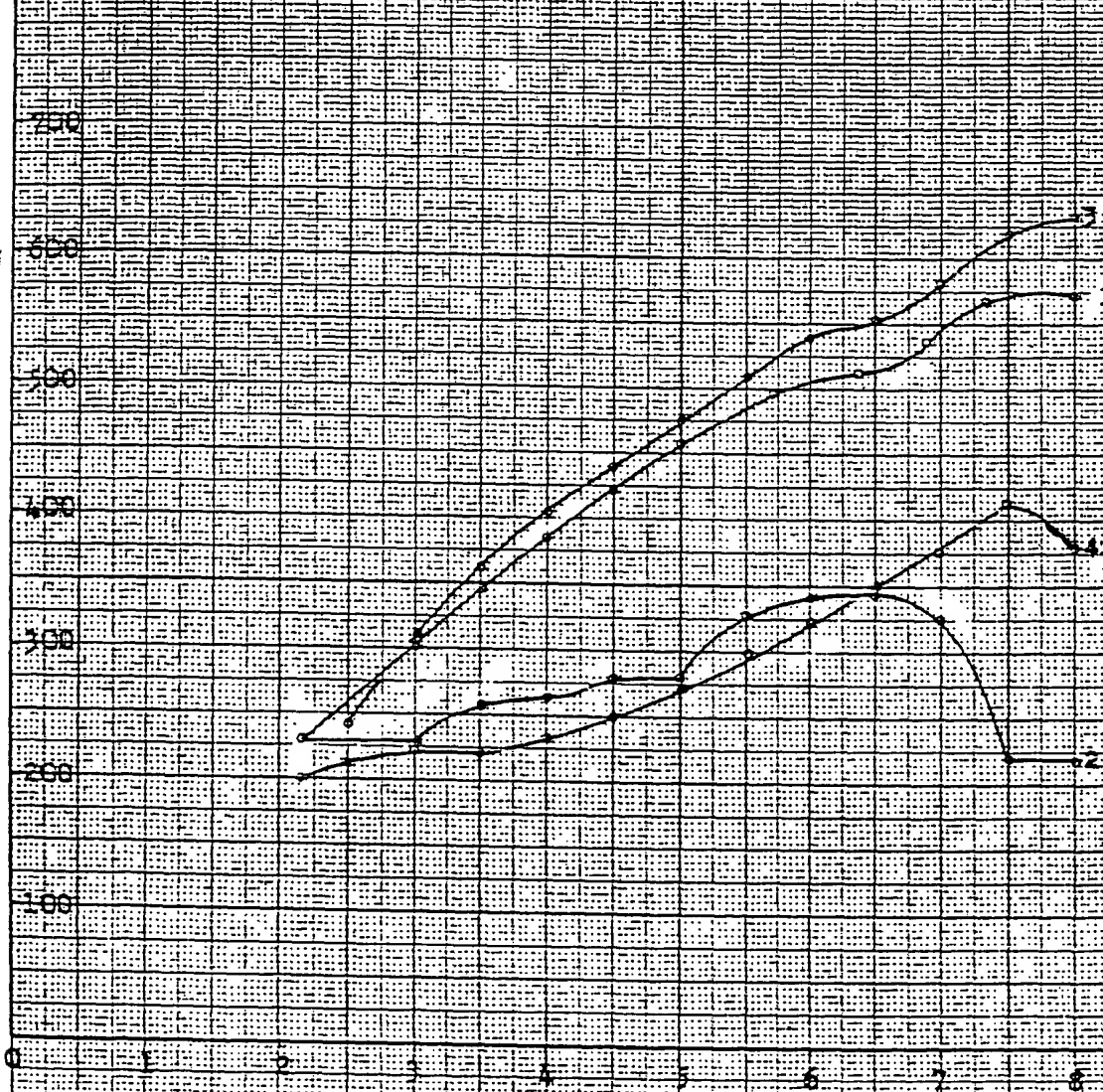
AND SURFACE TEMPS. BETWEEN 11 AND 12 PRESS



THERMAL TUBE ON 89, 46N AT 12, 26, 44, 52, 58, 64, 70, 76, 82, 88, 94, 100, 106, 112, 118, 124, 130, 136, 142, 148, 154, 160, 166, 172, 178, 184, 190, 196, 202, 208, 214, 220, 226, 232, 238, 244, 250, 256, 262, 268, 274, 280, 286, 292, 298, 304, 310, 316, 322, 328, 334, 340, 346, 352, 358, 364, 370, 376, 382, 388, 394, 400, 406, 412, 418, 424, 430, 436, 442, 448, 454, 460, 466, 472, 478, 484, 490, 496, 502, 508, 514, 520, 526, 532, 538, 544, 550, 556, 562, 568, 574, 580, 586, 592, 598, 604, 610, 616, 622, 628, 634, 640, 646, 652, 658, 664, 670, 676, 682, 688, 694, 700, 706, 712, 718, 724, 730, 736, 742, 748, 754, 760, 766, 772, 778, 784, 790, 796, 802, 808, 814, 820, 826, 832, 838, 844, 850, 856, 862, 868, 874, 880, 886, 892, 898, 904, 910, 916, 922, 928, 934, 940, 946, 952, 958, 964, 970, 976, 982, 988, 994, 1000

10-456-9
 4-13-49, WS.

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 14 42 |
| 2 | 14 |
| 3 | 28 |
| 4 | 44 |



Thousands of hours from start of 19.

Figure 70

LA 38-10.

1.17.59.79.

TEMPERATURE BY LG. 762 AT 12, 28, 44 FEET

AND AVERAGE TEMP. BETWEEN 34 AND 42 FEET.



Figure 79

19-436-17,
4.1.55, WS.

TEMPERATURE IN °C. AT 12, 28, 44, 72, 88
AND 100 CM. DEPTHS IN 42 CM. DIA.

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 12 |
| 2 | 28 |
| 3 | 44 |
| 4 | 72 |
| 5 | 88 |
| 6 | 100 |

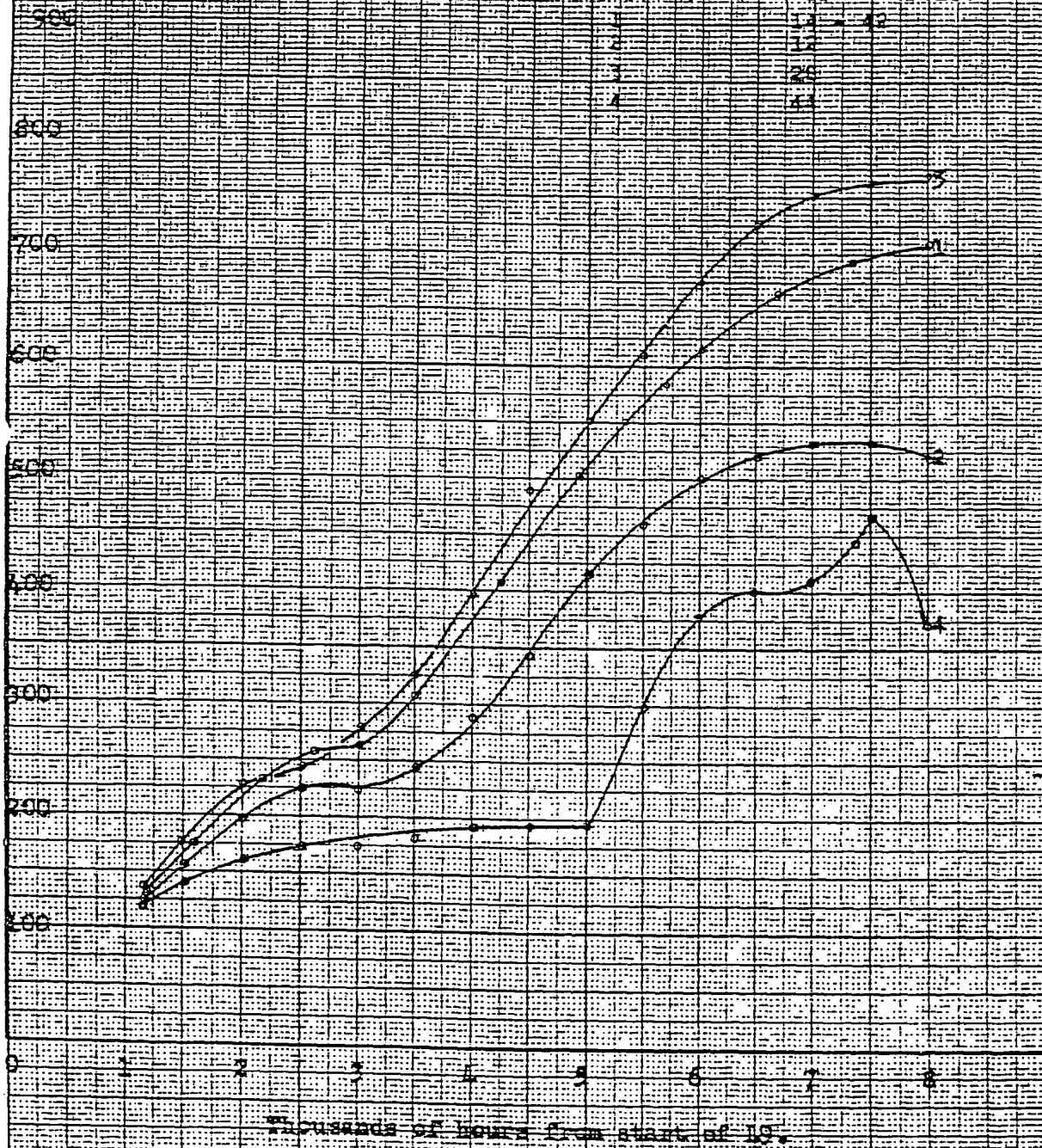


Figure 80

19-426-12
1.17.59.WS.

TEMPERATURE IN 19. T60 17 22 28 34 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET

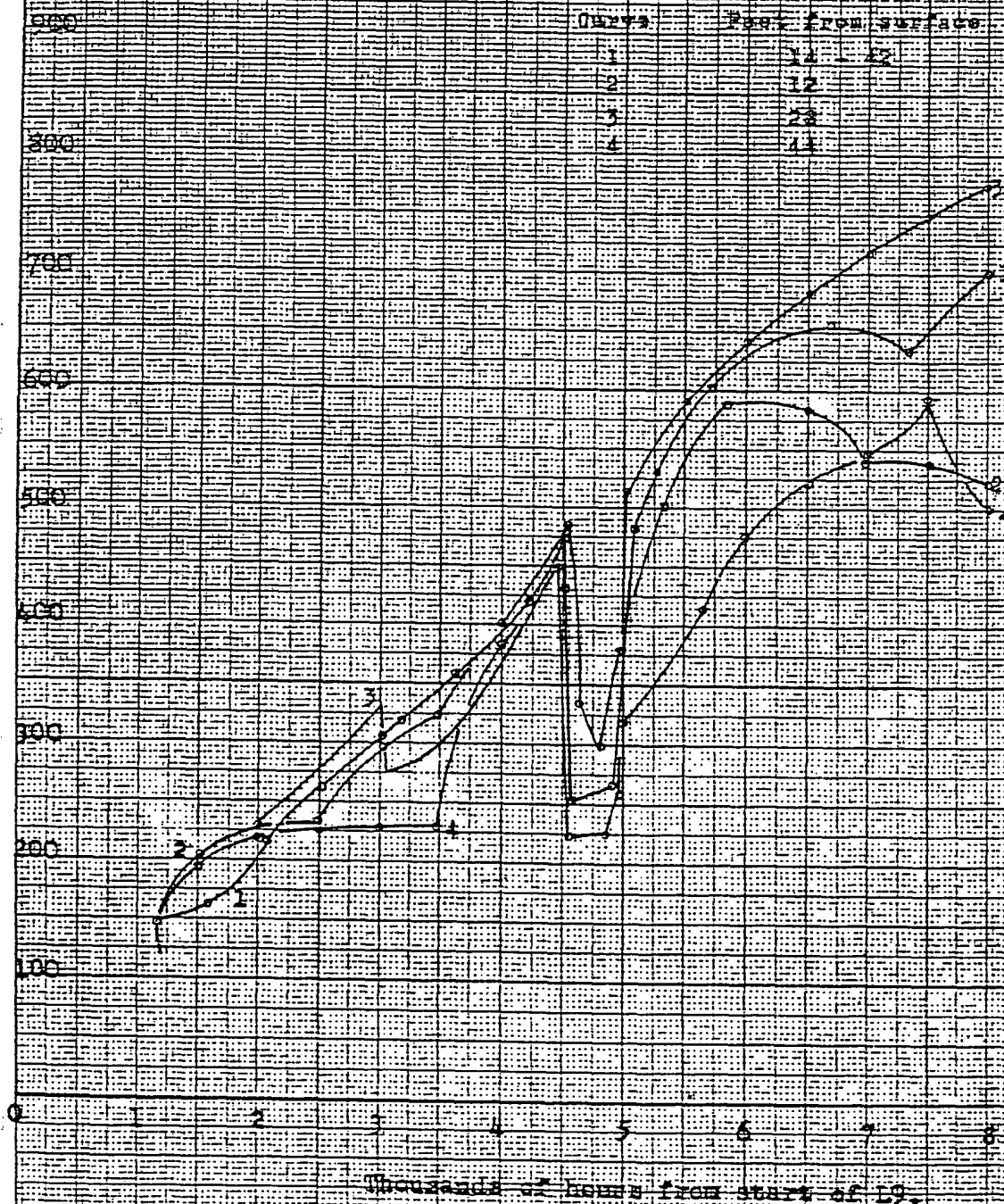


Figure 21

1940-42-43
4.19.48.49

TEMPERATURE IN 12, 20, 28, 44 FEET
AND AVERAGE TEMP. BETWEEN 12 AND 42 FEET.

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 12 - 42 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |

900
800
700
600
500
400
300
200
100
0

Thousands of hours from start of 19.

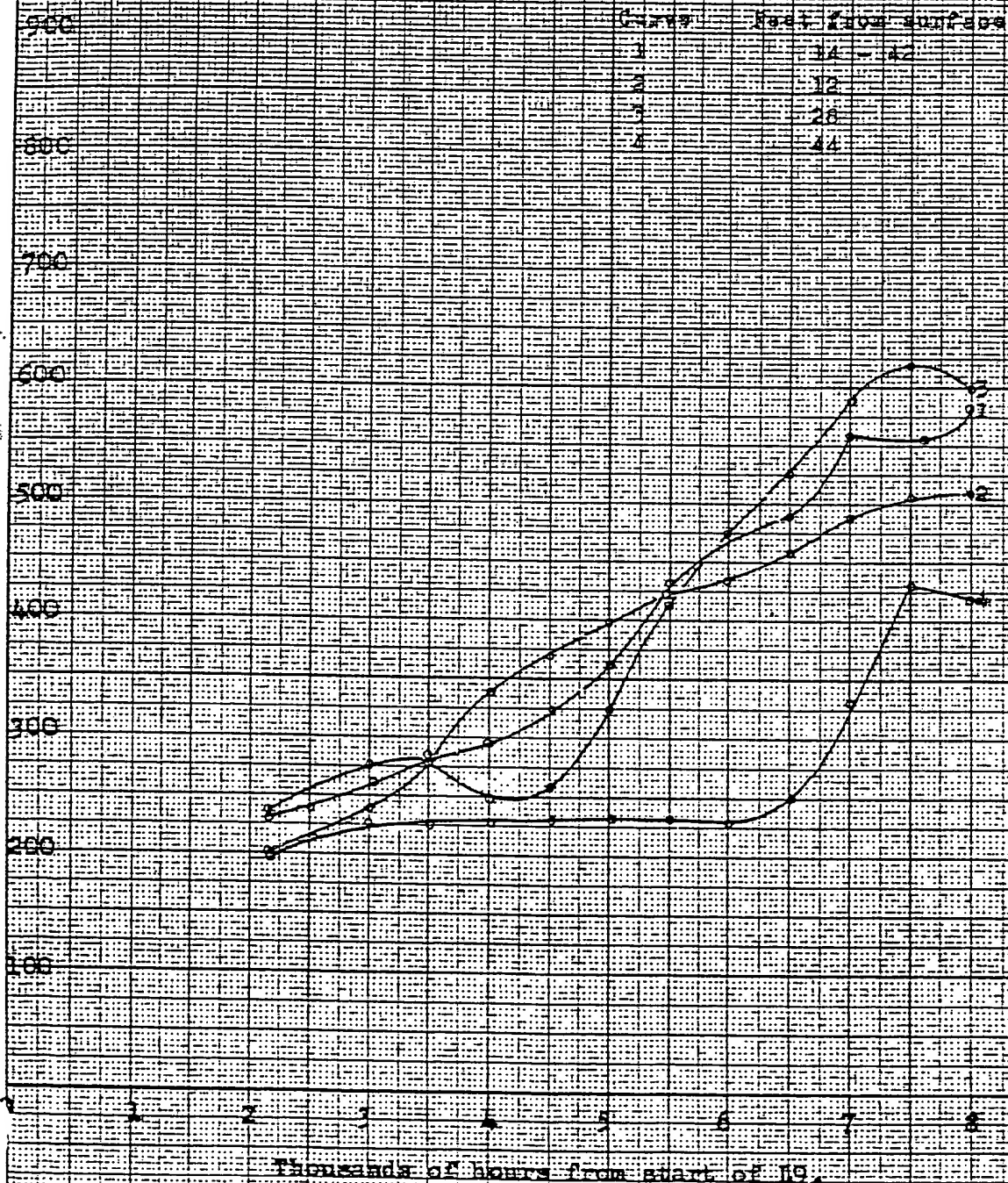
Figure 20

29-476-14.

4.13.66 WS.

TEMPERATURE IN 19. 47601. AT 12, 28, 44 FEET
AND AVERAGE TEMP. BETWEEN 12 AND 44 FEET

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 12 - 42 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |



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MILLIMETER

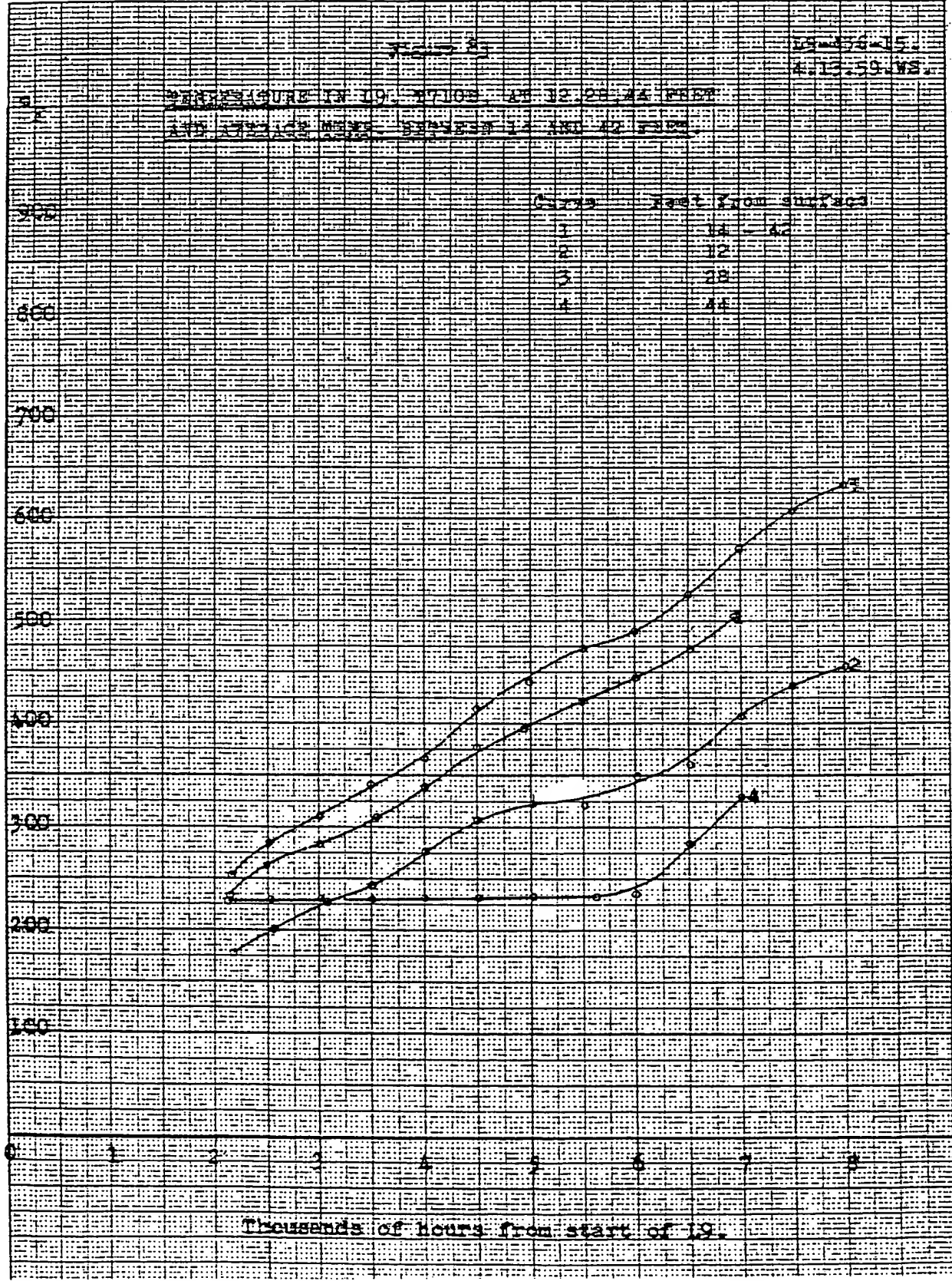


Figure 8

19-456-16

1.3.59.88

TEMPERATURE IN 13, 132, 10, 12, 28, 44 FEET
AND AVERAGE TEMP BETWEEN 12 AND 42 FEET

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 12 - 42 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |

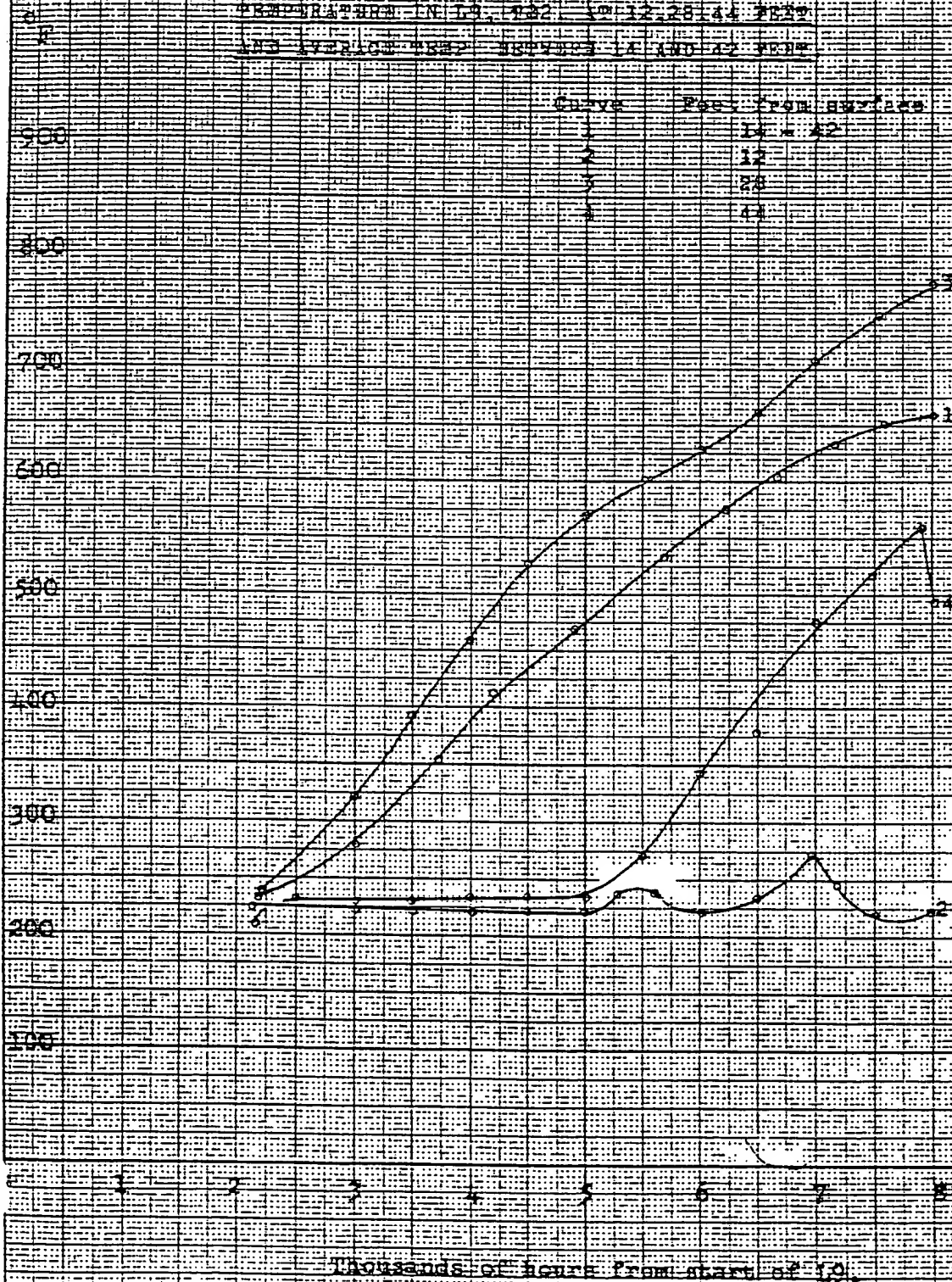


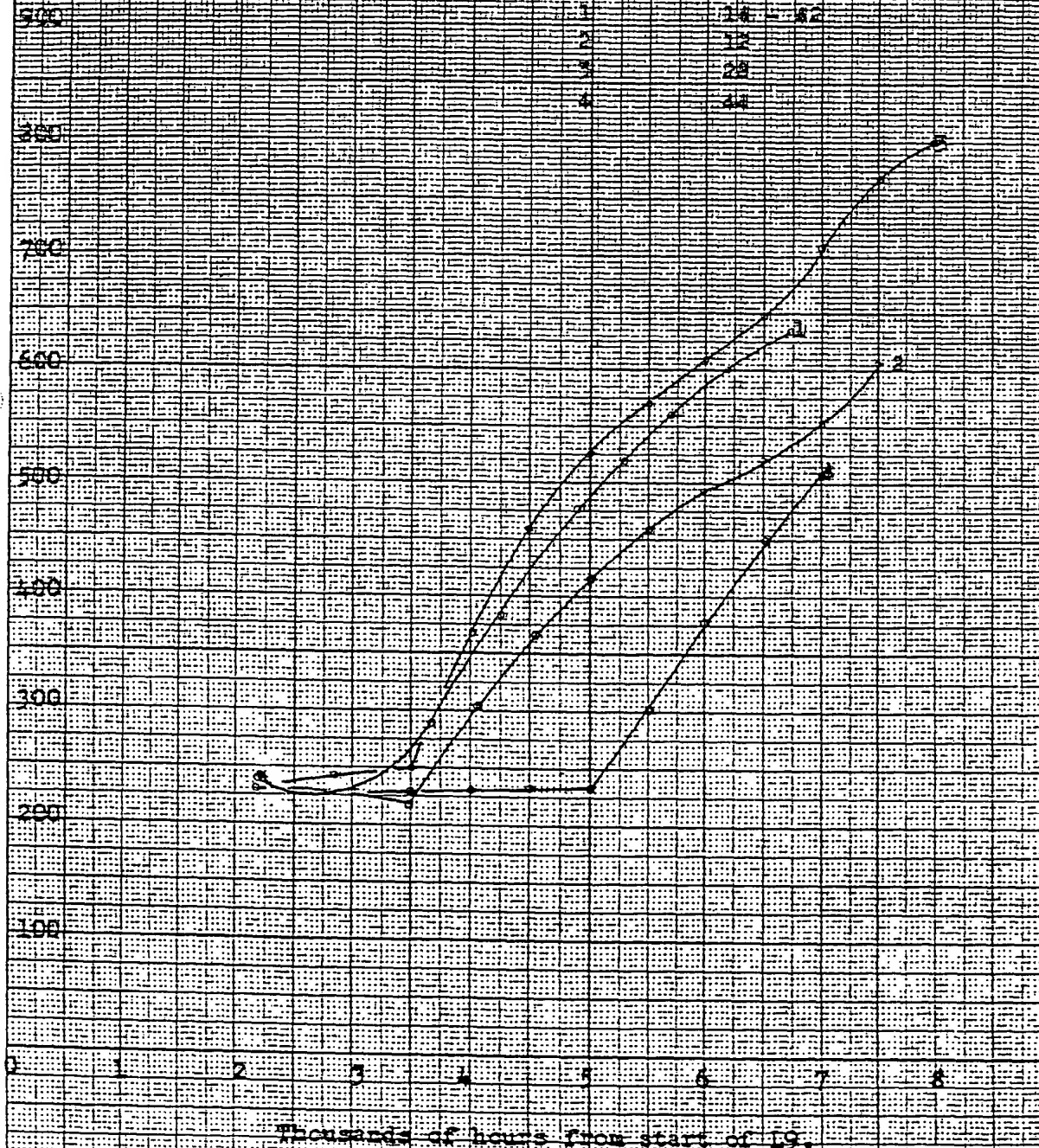
Figure 28

B9-438-JF.

4-13-59, MS.

TEMPERATURE IN °F. FOR 12, 28, 44 FEET
AND AVERAGE TEMP. BETWEEN 14 AND 42 FEET.

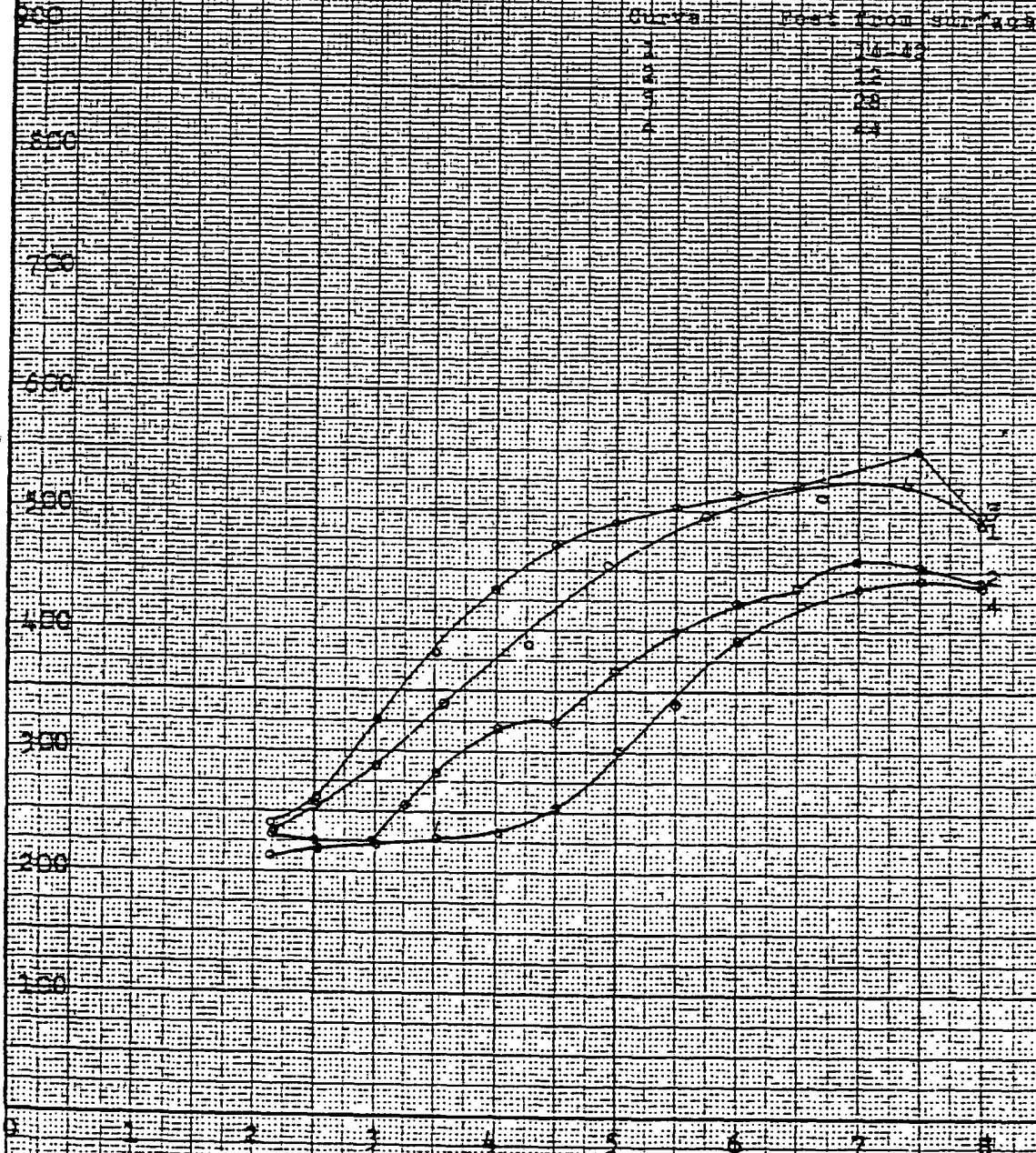
| Curve | Feet from surface |
|-------|-------------------|
| 1 | 12 - 42 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |



TEMPERATURE IN 19, 5102, 12, 12, 28, 44 FEET
AND AVERAGE TEMP. DEPTHS IN ITS 20 FEET

NO. 436-18.
17.59.49.

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 16-42 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |



Thousands of hours from start of 19.

Figure 87

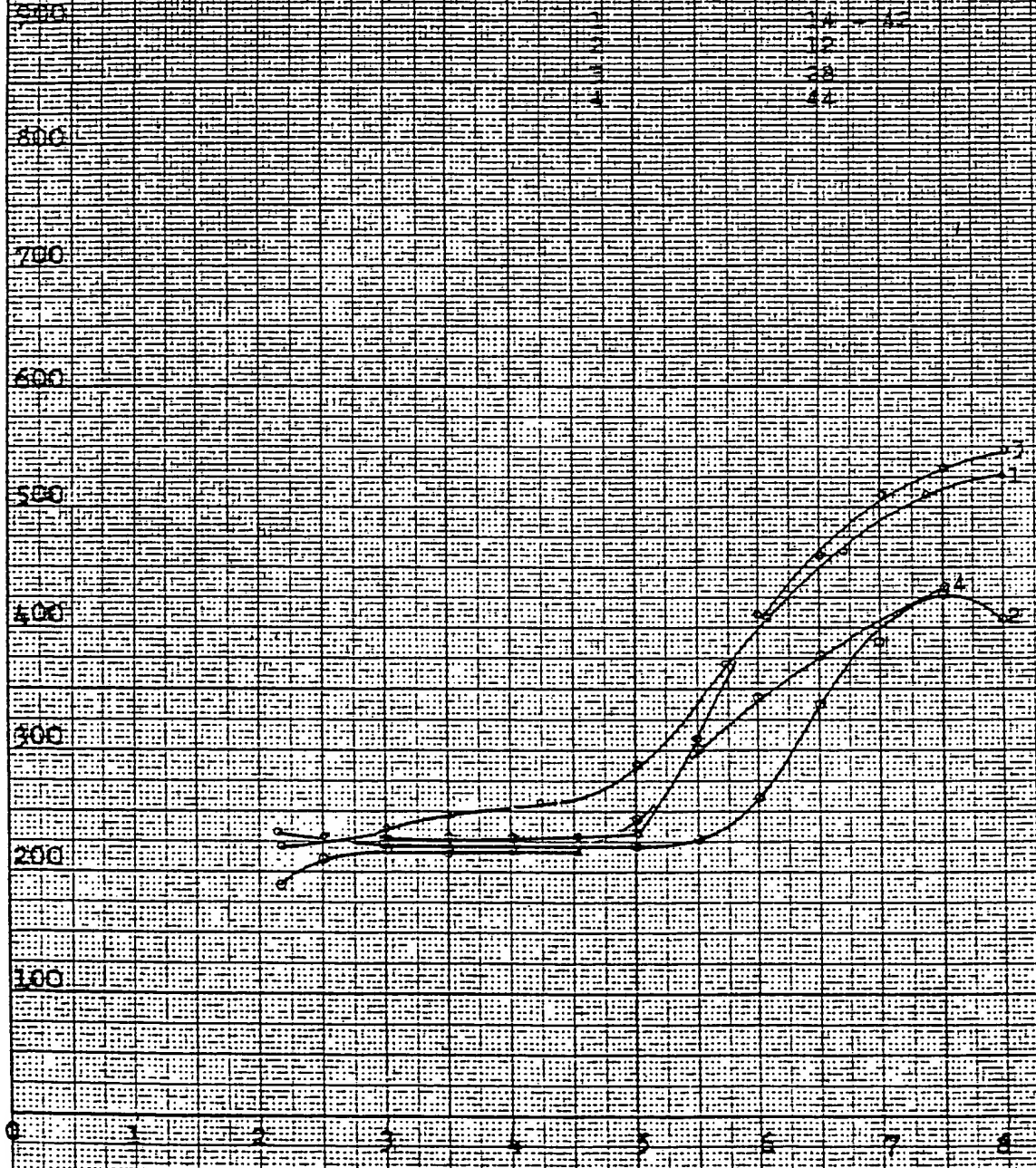
19-438-39

4.2.59.73

SEA-ANCHORS IN IS. #103, AT 12, 28, 44 FEET

250 AVERAGE TEMP. MEASURED BY AID. 12. 19. 73

| Curve | Feet from surface |
|-------|-------------------|
| 1 | 14 |
| 2 | 12 |
| 3 | 28 |
| 4 | 44 |



Thousands of hours from start of IS.

L9-444
5-22-59 EP

Figure 88

AVERAGE TEMPERATURE AT 28 FEET AND 14 TO
42 FEET IN "REACTOR" TEMPERATURE WELLS
(WELLS 11, 12, 13, 14, 15, 16, 17, 18)

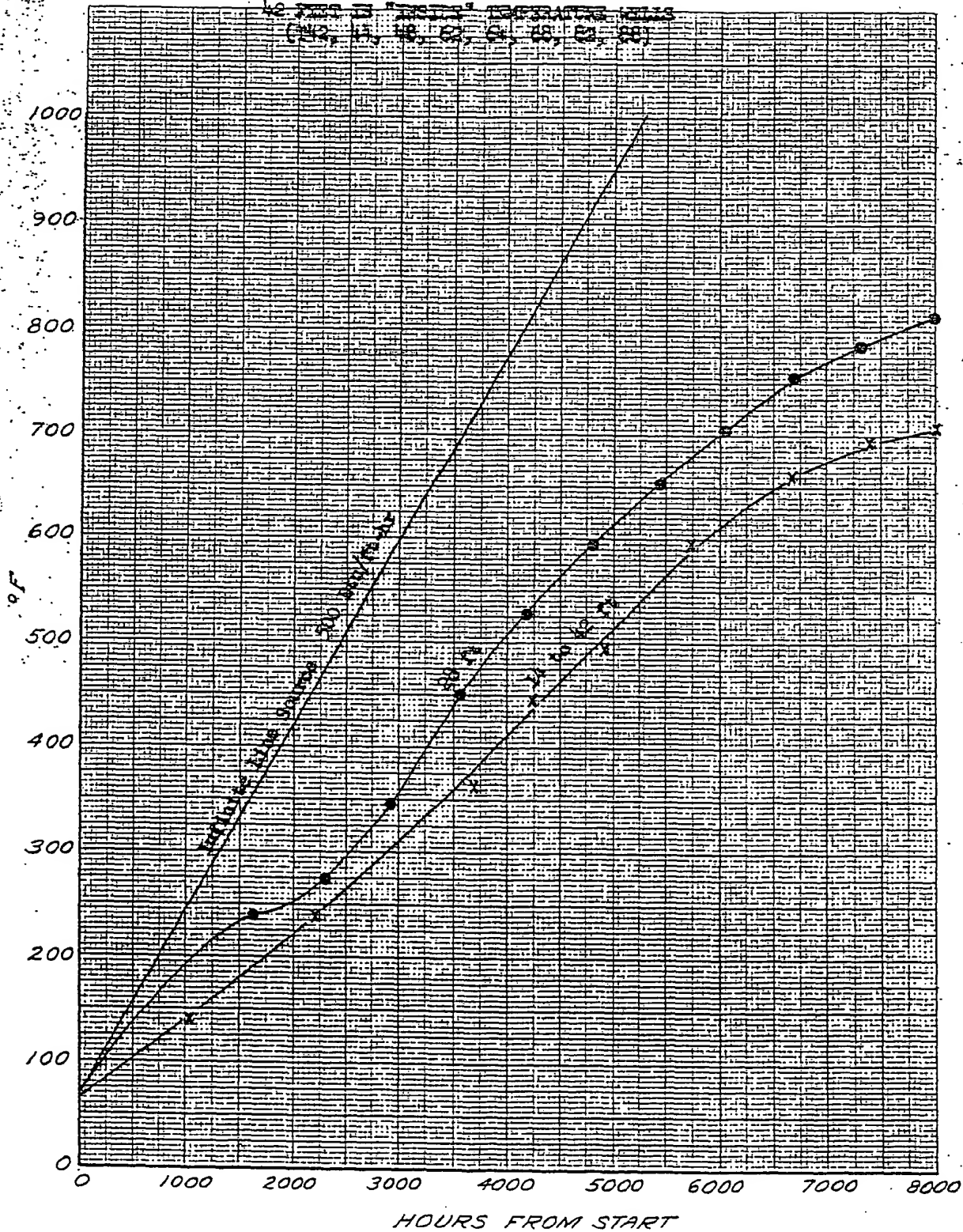
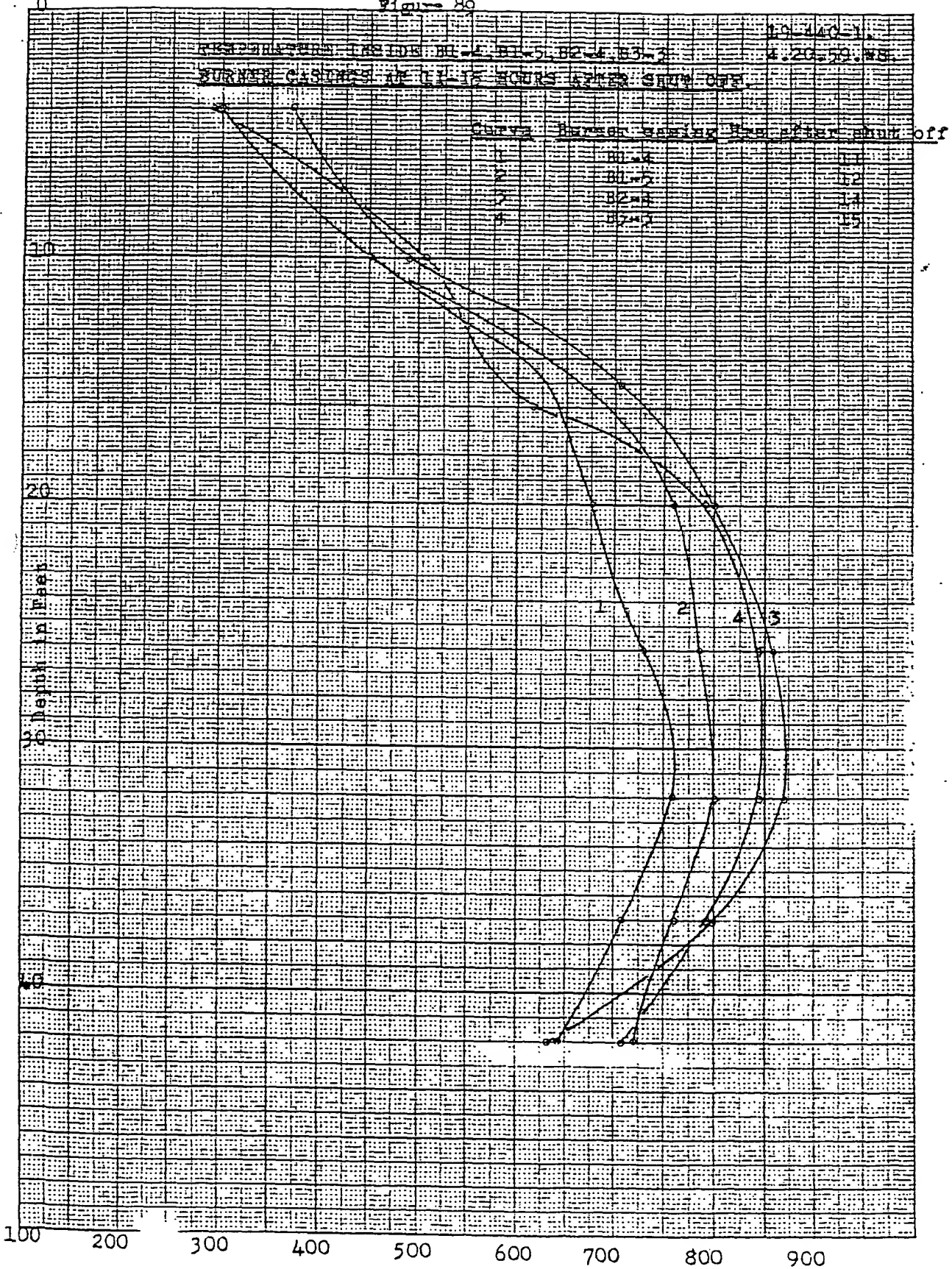


Figure 80



10-440-2
4.20.59.83

| | | | | | |
|---|--|--|--|--|----|
| 1 | | | | | E6 |
| 2 | | | | | F6 |
| 3 | | | | | G6 |

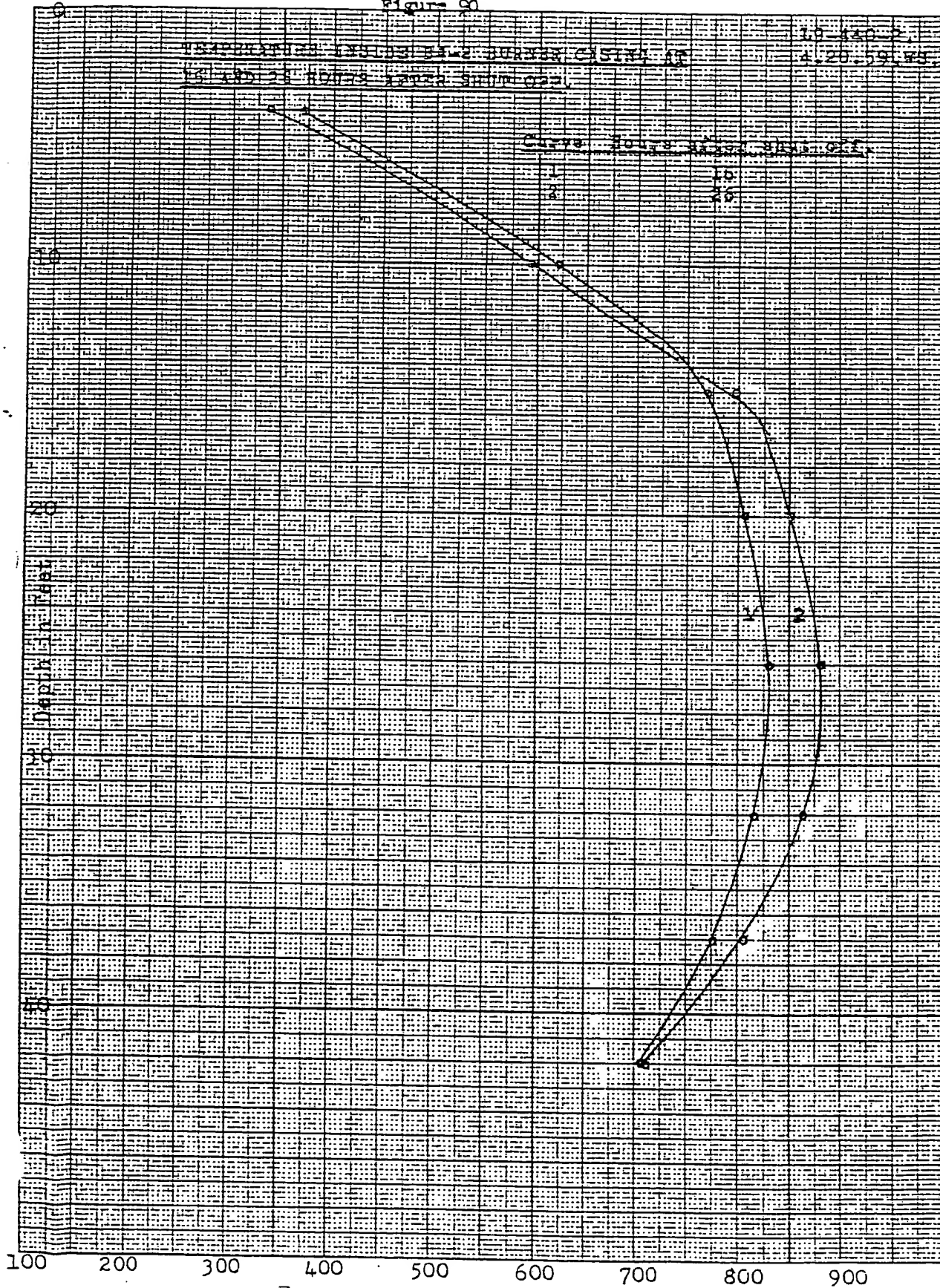


Figure 91

59-24013
1-20-59, VS.

TEMPERATURE LOGS OF 24-5 BUREAU OCEANOGRAPHIC
LV AND 28 HOURS AFTER SHUT-OFF

TEMPERATURE LOGS OF 24-5 BUREAU OCEANOGRAPHIC
LV AND 28 HOURS AFTER SHUT-OFF

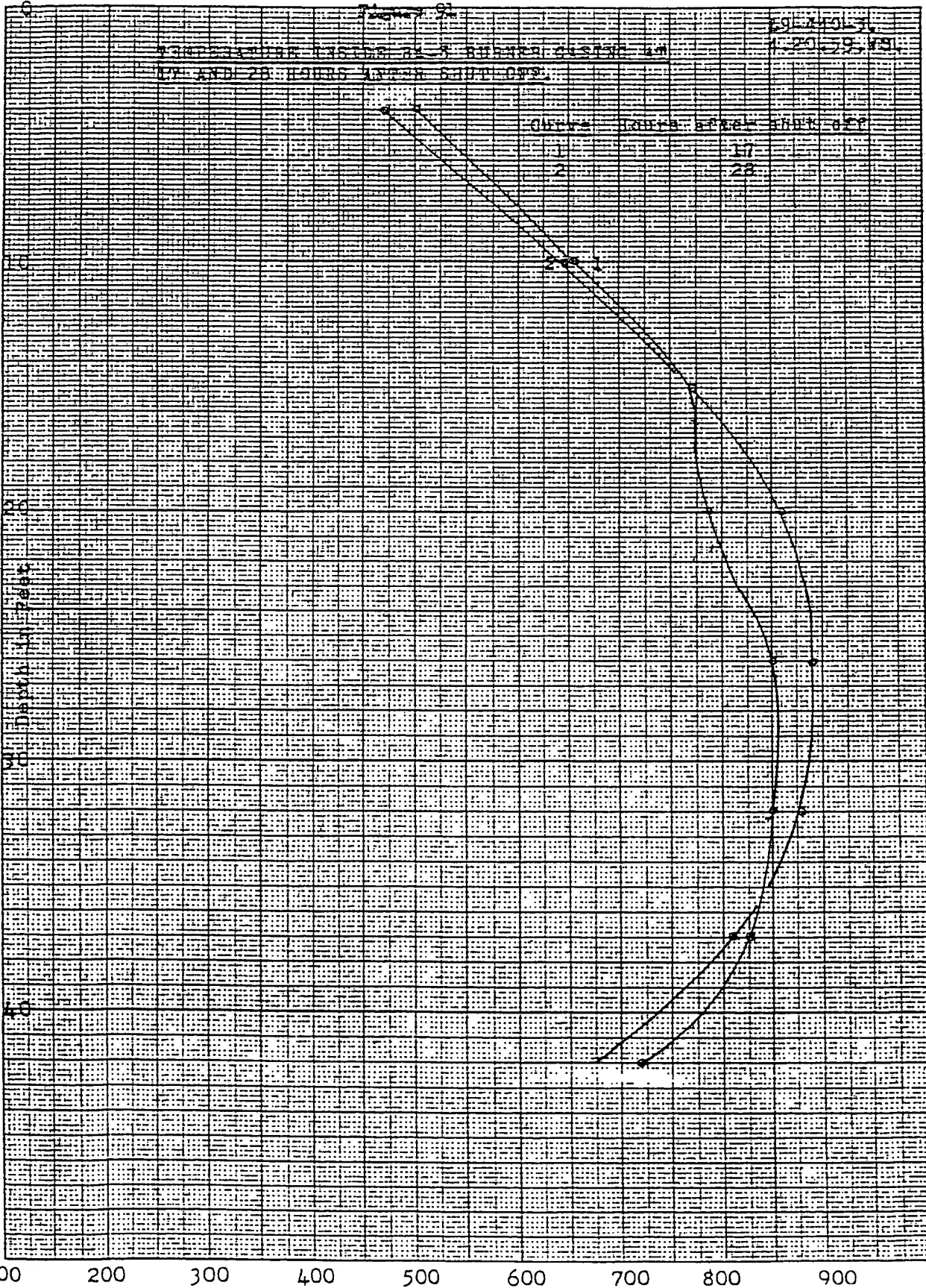


Figure 92

WATER SURFACE ELEVATION OF B-6 BERMAR CASTLE
AT 19 AND 29 HOURS AFTER SHUT OFF.

USACE
X-20-59-03

19 HOURS AFTER SHUT OFF

29

19

29

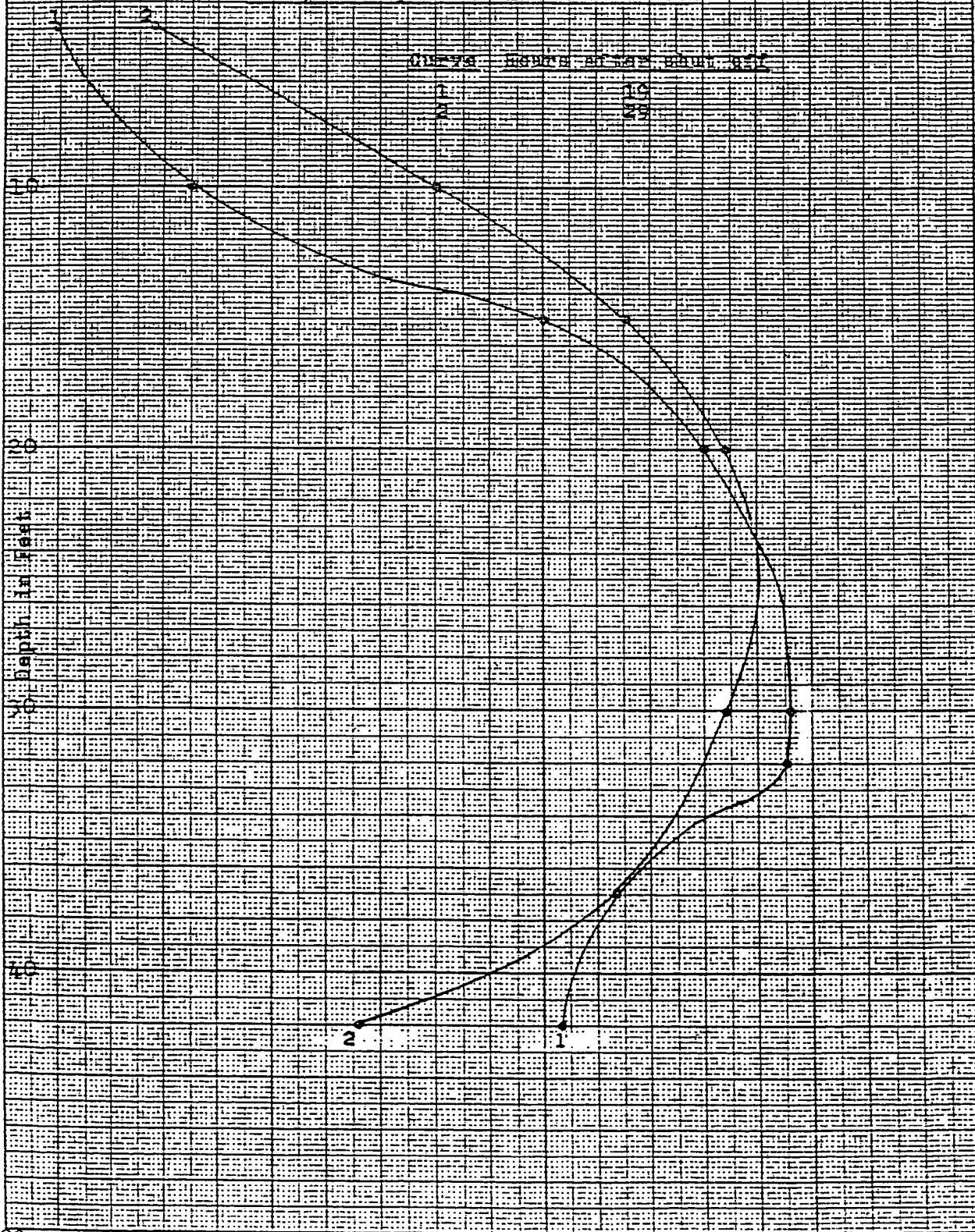
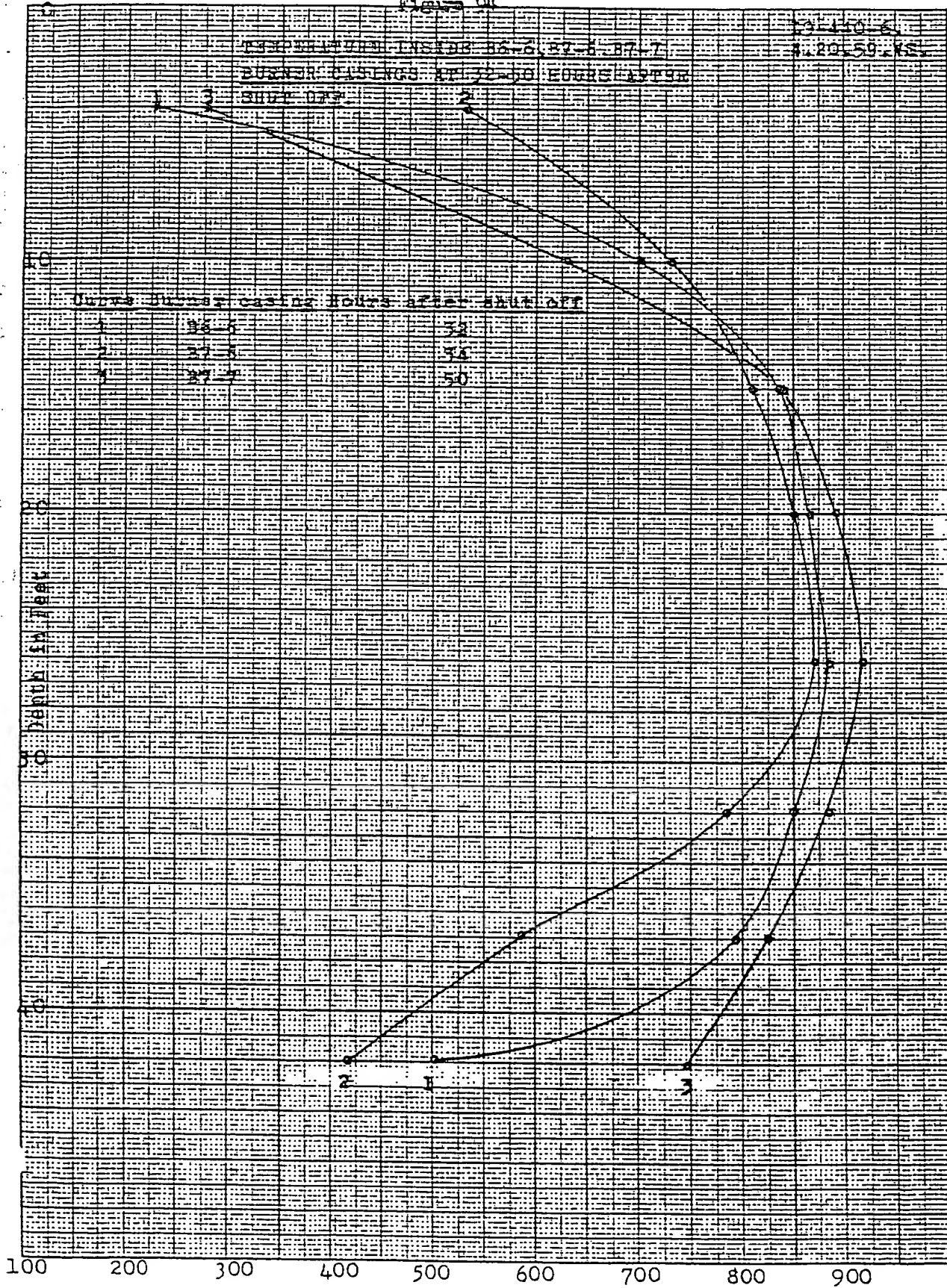


Figure 93

20000-10000 10000-5000 5000-2500 2500-1000 1000-500 500-250 250-100 100-50 50-25 25-10 10-5 5-2.5 2.5-1 1-0.5 0.5-0.25 0.25-0.125 0.125-0.0625 0.0625-0.03125 0.03125-0.015625 0.015625-0.0078125 0.0078125-0.00390625 0.00390625-0.001953125 0.001953125-0.0009765625 0.0009765625-0.00048828125 0.00048828125-0.000244140625 0.000244140625-0.0001220703125 0.0001220703125-0.00006103515625 0.00006103515625-0.000030517578125 0.000030517578125-0.0000152587890625 0.0000152587890625-0.00000762939453125 0.00000762939453125-0.000003814697265625 0.000003814697265625-0.0000019073486328125 0.0000019073486328125-0.00000095367431640625 0.00000095367431640625-0.000000476837158203125 0.000000476837158203125-0.0000002384185791015625 0.0000002384185791015625-0.00000011920928955078125 0.00000011920928955078125-0.000000059604644775390625 0.000000059604644775390625-0.0000000298023223876953125 0.0000000298023223876953125-0.00000001490116119384765625 0.00000001490116119384765625-0.000000007450580596923828125 0.000000007450580596923828125-0.0000000037252902984619140625 0.0000000037252902984619140625-0.00000000186264514923095703125 0.00000000186264514923095703125-0.000000000931322574615478515625 0.000000000931322574615478515625-0.0000000004656612873077392578125 0.0000000004656612873077392578125-0.00000000023283064365386962890625 0.00000000023283064365386962890625-0.000000000116415321826934814453125 0.000000000116415321826934814453125-0.0000000000582076609134674072265625 0.0000000000582076609134674072265625-0.00000000002910383045673370361328125 0.00000000002910383045673370361328125-0.000000000014551915228366851806640625 0.000000000014551915228366851806640625-0.0000000000072759576141834259033203125 0.0000000000072759576141834259033203125-0.00000000000363797880709171295166015625 0.00000000000363797880709171295166015625-0.000000000001818989403545856475830078125 0.000000000001818989403545856475830078125-0.0000000000009094947017729282379150390625 0.0000000000009094947017729282379150390625-0.00000000000045474735088646411895751953125 0.00000000000045474735088646411895751953125-0.000000000000227373675443232059478759765625 0.000000000000227373675443232059478759765625-0.0000000000001136868377216160297393798828125 0.0000000000001136868377216160297393798828125-0.00000000000005684341886080801486968994140625 0.00000000000005684341886080801486968994140625-0.000000000000028421709430404007434844970703125 0.000000000000028421709430404007434844970703125-0.0000000000000142108547152020037174224883515625 0.0000000000000142108547152020037174224883515625-0.00000000000000710542735760100185871124417578125 0.00000000000000710542735760100185871124417578125-0.000000000000003552713678800500929355622087890625 0.000000000000003552713678800500929355622087890625-0.0000000000000017763568394002504646778110439453125 0.0000000000000017763568394002504646778110439453125-0.00000000000000088817841970012523233890552197265625 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Figure 4b

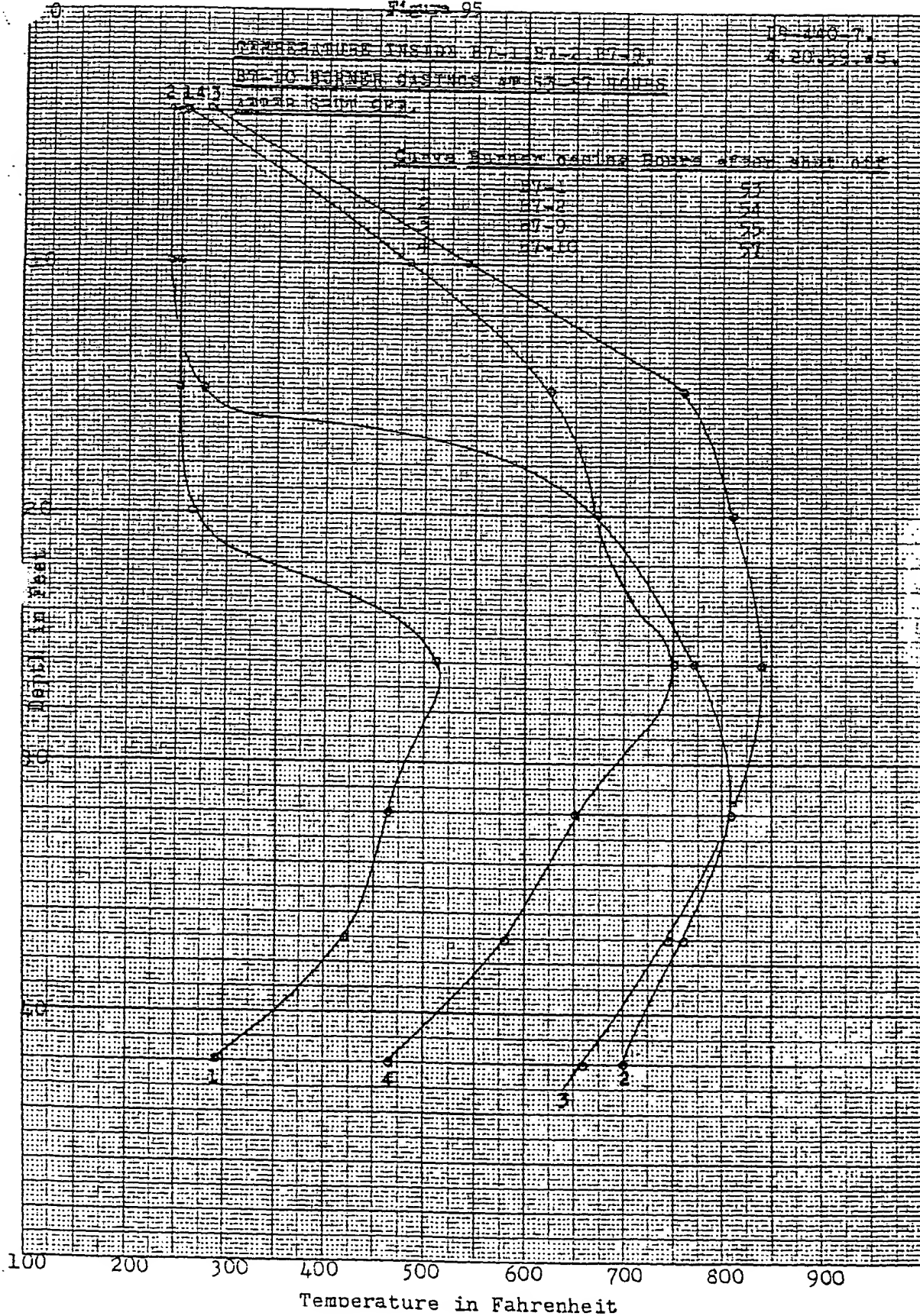


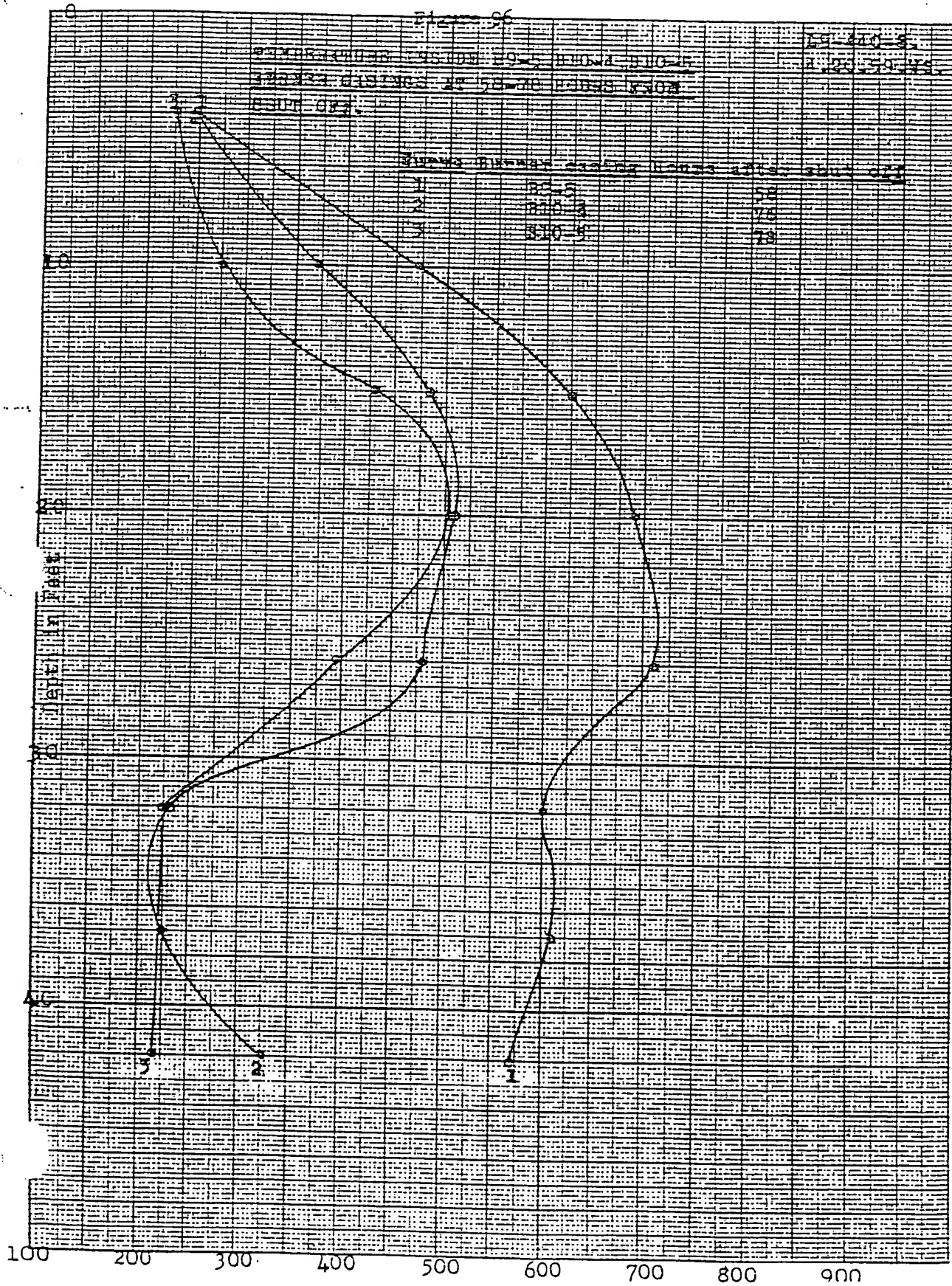
TEMPERATURE INSIDE BT-1 BT-2 BT-3
BT-10 BURIED DISTANCE 10 FT. 10 FT. 10 FT.
1200-1500 G.P.

10-100-7
2-20-25-45

Curve Buried Distance 10 FT. 10 FT. 10 FT.

| | | |
|---|-------|----|
| 1 | BT-1 | 95 |
| 2 | BT-2 | 54 |
| 3 | BT-3 | 25 |
| 4 | BT-10 | 71 |



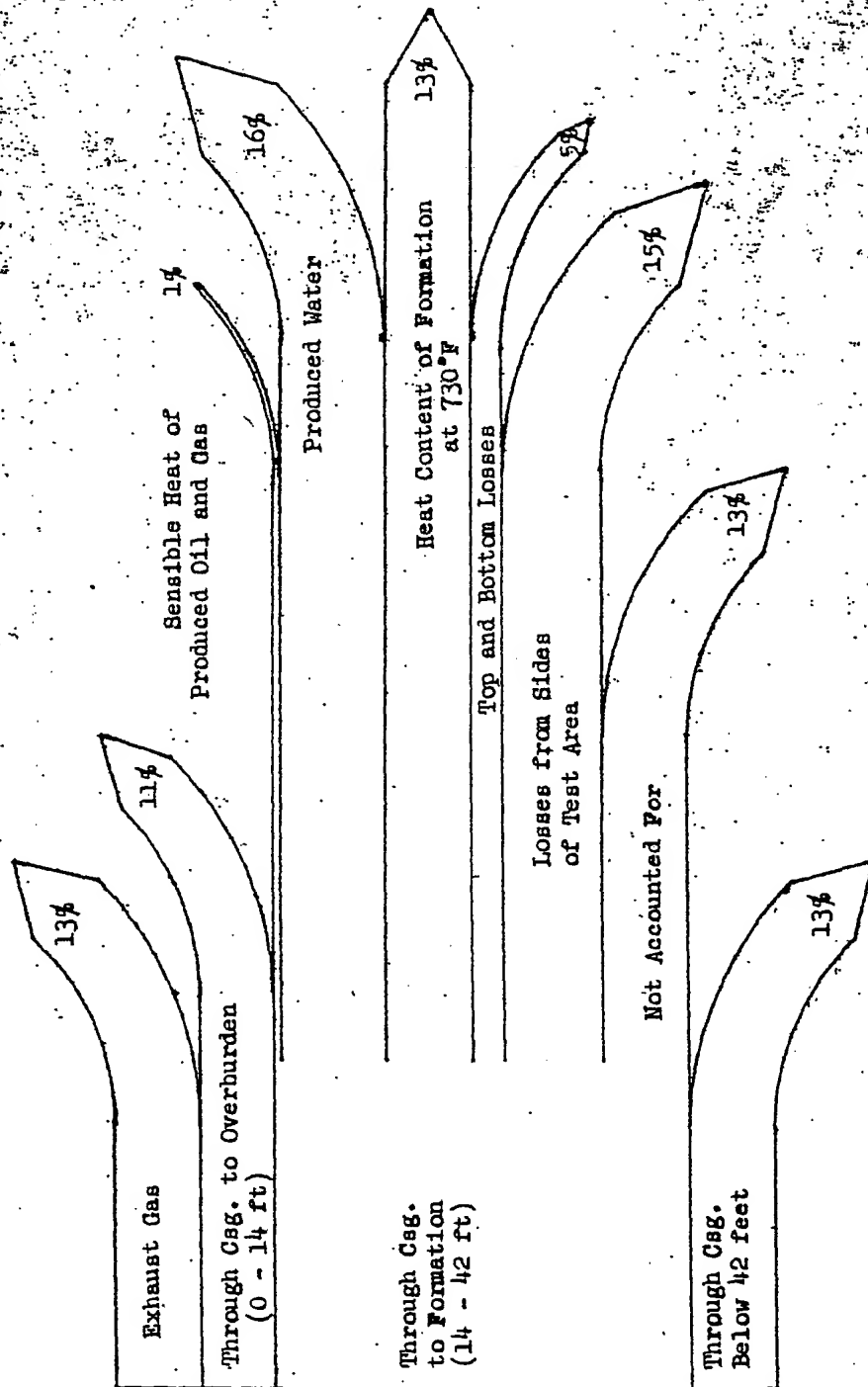


Approximate values for the curves:
 Curve 1: 100, 200, 300
 Curve 2: 100, 300, 400
 Curve 3: 100, 500, 600

| Curve | Approx. Value | Approx. Value |
|-------|---------------|---------------|
| 1 | 100 | 100 |
| 2 | 300 | 300 |
| 3 | 500 | 500 |

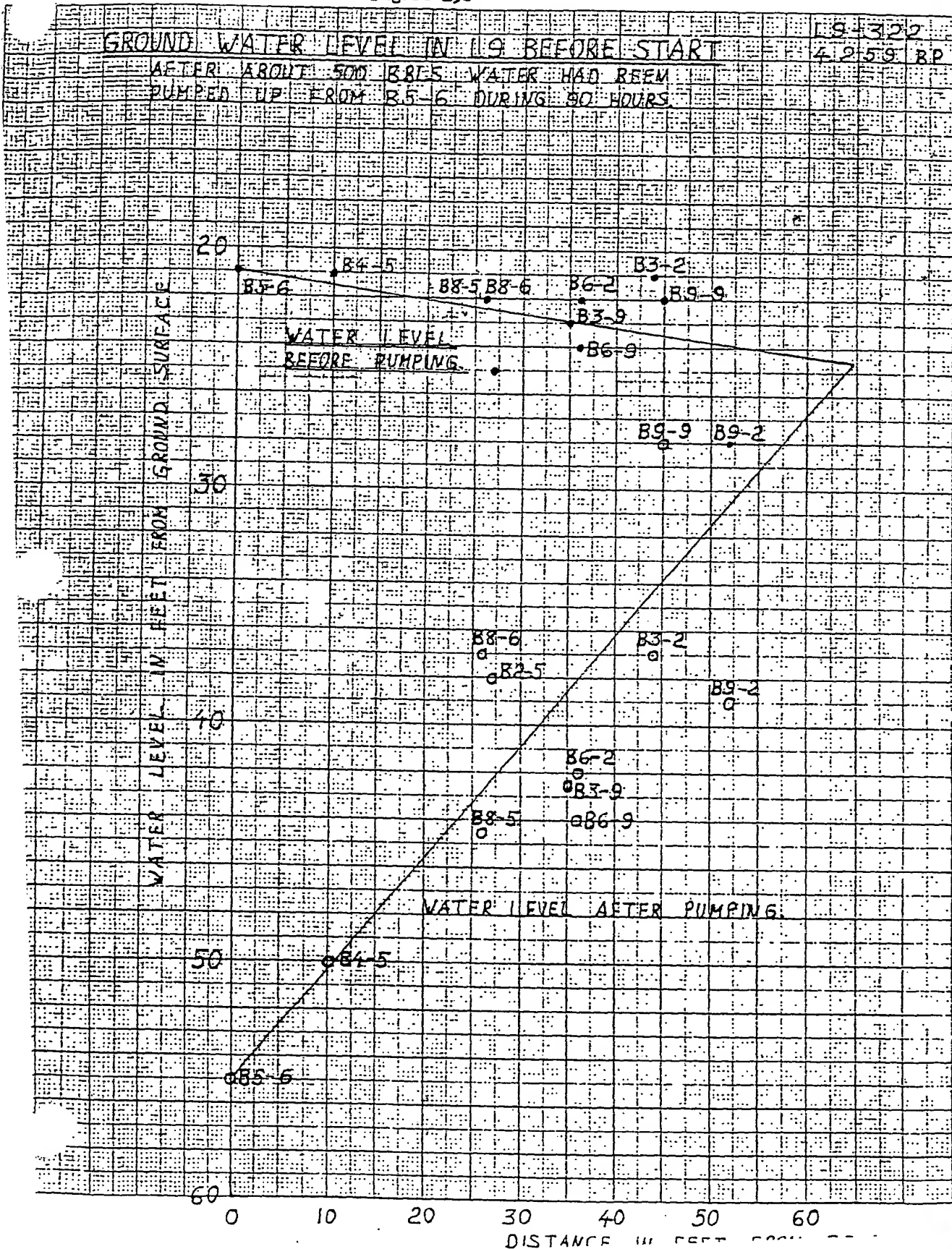
Figure 97

19 HEAT BALANCE



Total Heat Input (100%)

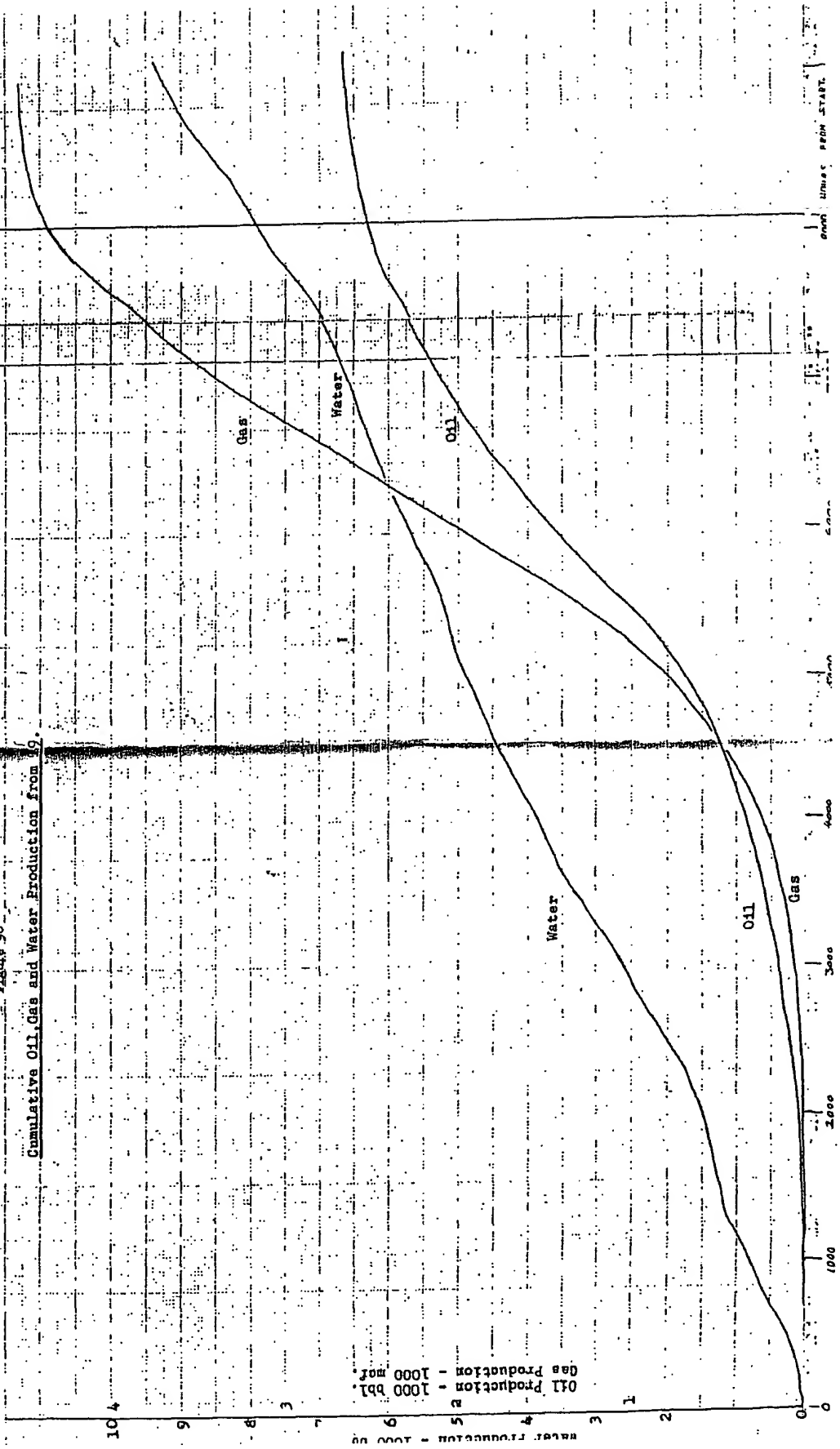
Figure 156



19-319
3-25-59.BP

Figure 98

Cumulative Oil, Gas and Water Production from 9



Oil Production - 1000 bbl.
Gas Production - 1000 mcf.

UNITED STATES

FEBRUARY 5 10 15 20 25 MARCH 5 10 15 20 25 APRIL 5 10 15 20 25 MAY 5 10 15 20 25 JUNE 5 10 15 20 25 JULY 5 10 15 20 25

Figure 99

Daily 19 Production
(2 days average)

Bbls of oil or water per day
1000 cu. ft. gas per day

Water

40

30

20

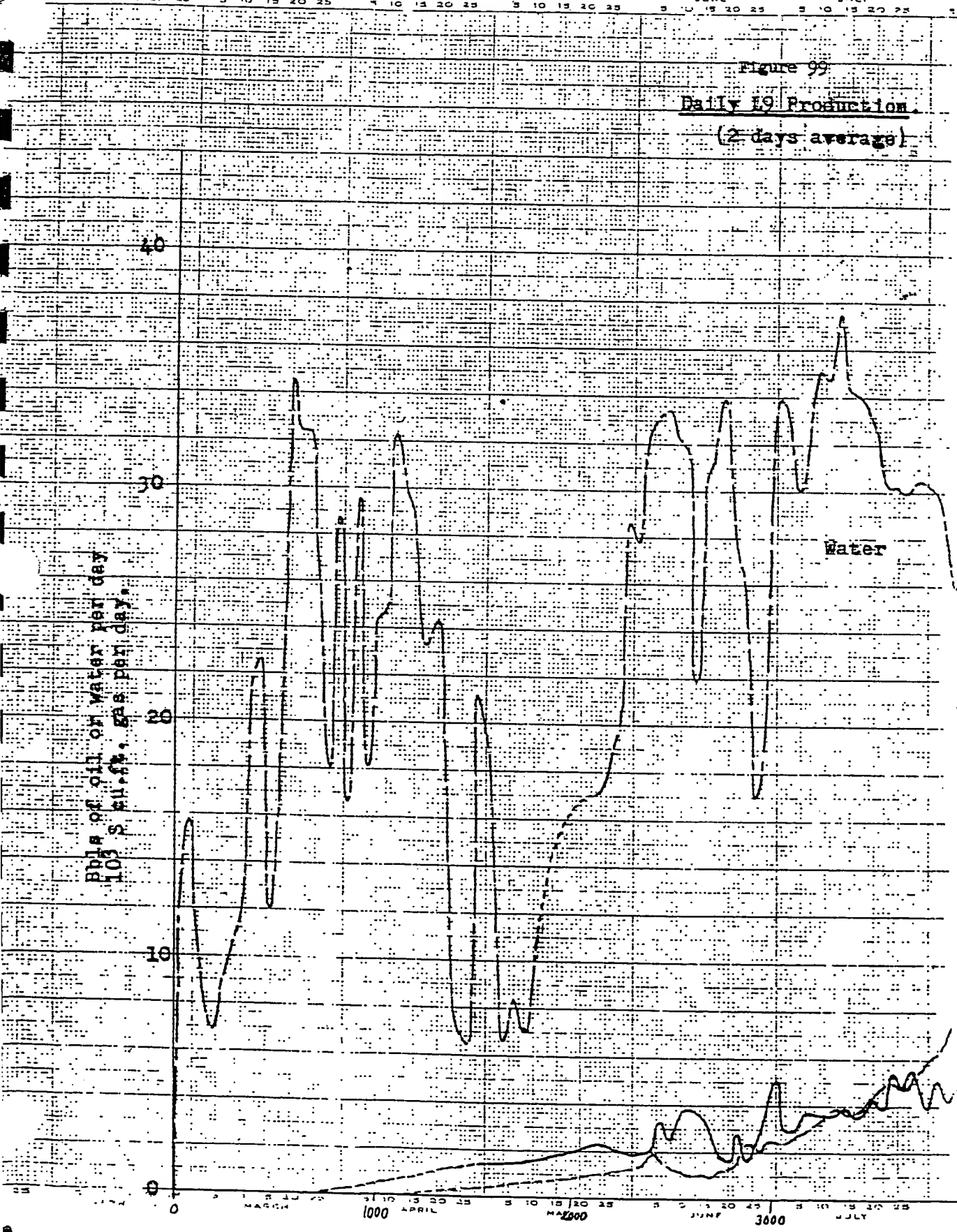
10

0

1000

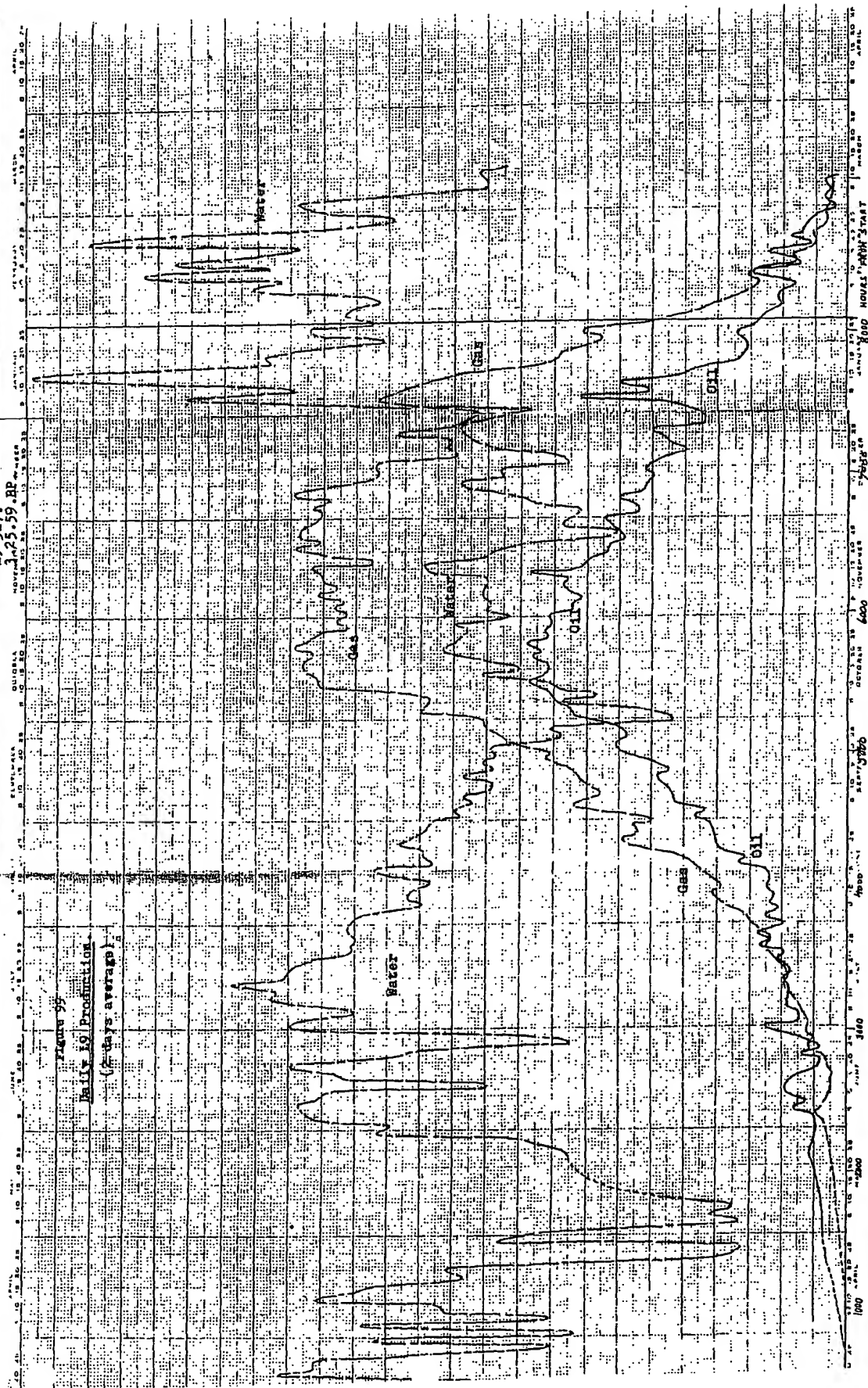
2000

3000



19-317.
3-25-59 RP

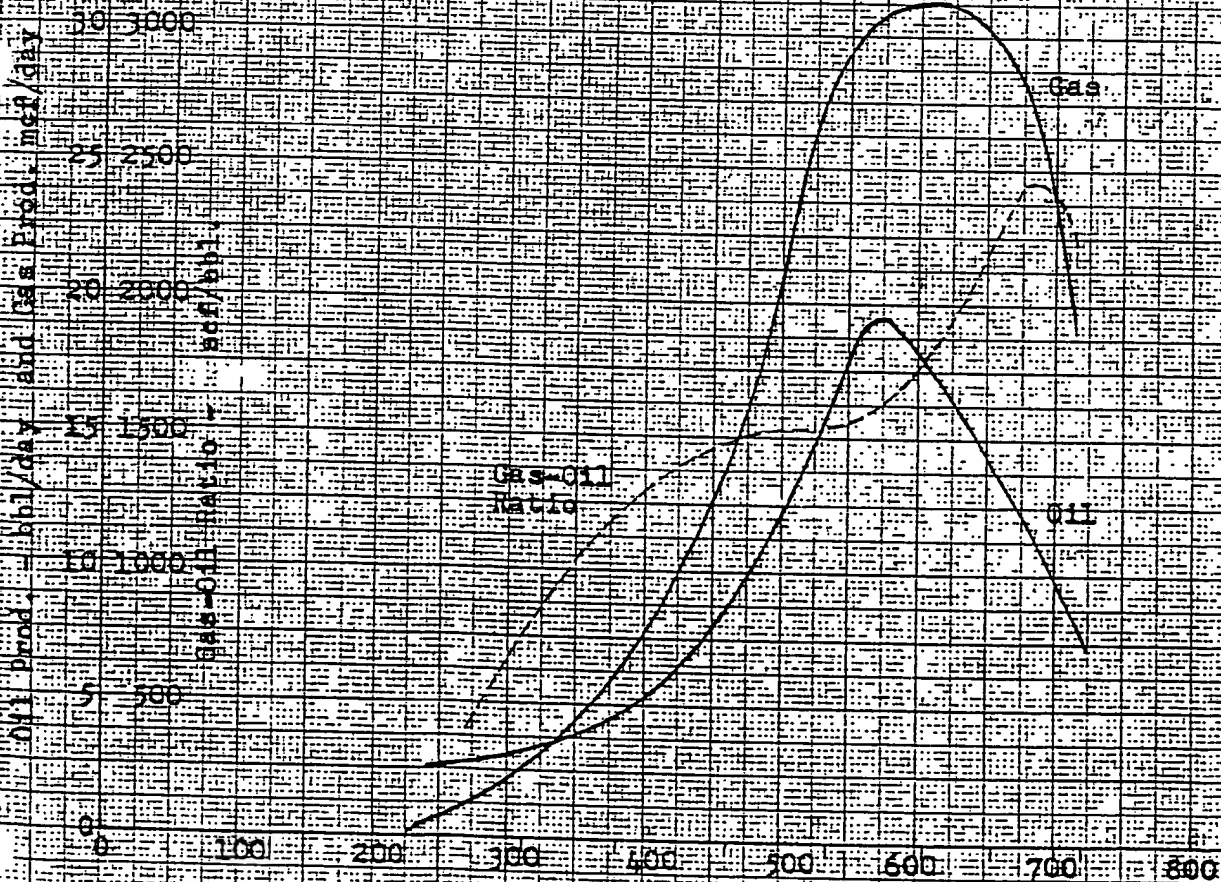
Figure 59
Daily 19 Production
(2 days average)



L9-705
5-16-59 RH

Figure 100

L9 PRODUCTION RATES VS. FORMATION TEMPERATURES



Average Temperature From 14 to 42 feet, Midway between burners - °F

19-318
3-25-79 BP

Figure 101

Gas/Oil and Water/Oil Ratios of 19 Production

(Weekly Average)

Gas/Oil Ratio - scf/bbl
Water/Oil Ratio - bbl/bbl

Gas/Oil Ratio

Water/Oil Ratio

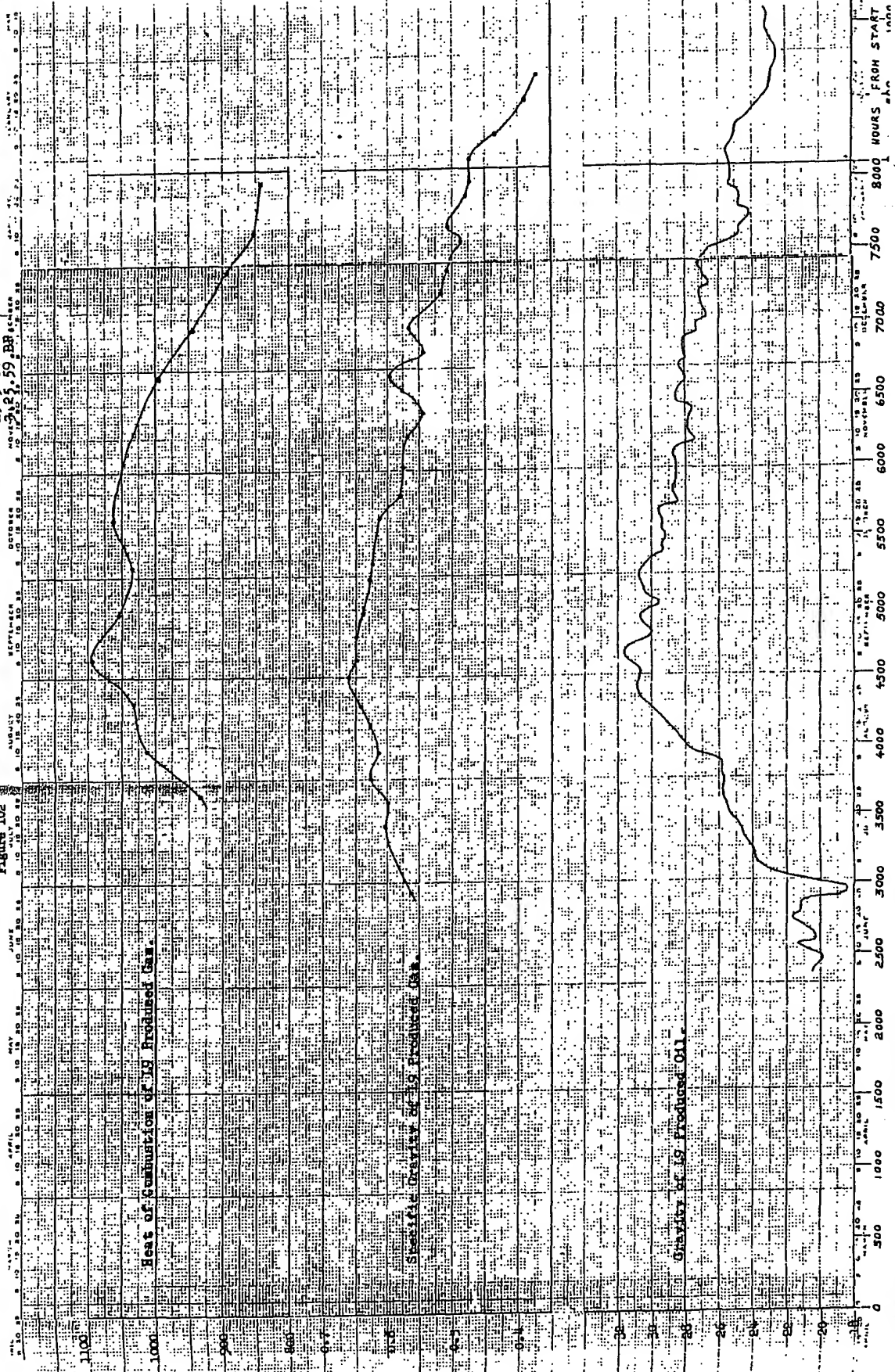
GOOD HOURS FROM START

Figure 102

19-506

NOV 21 22 59 BR

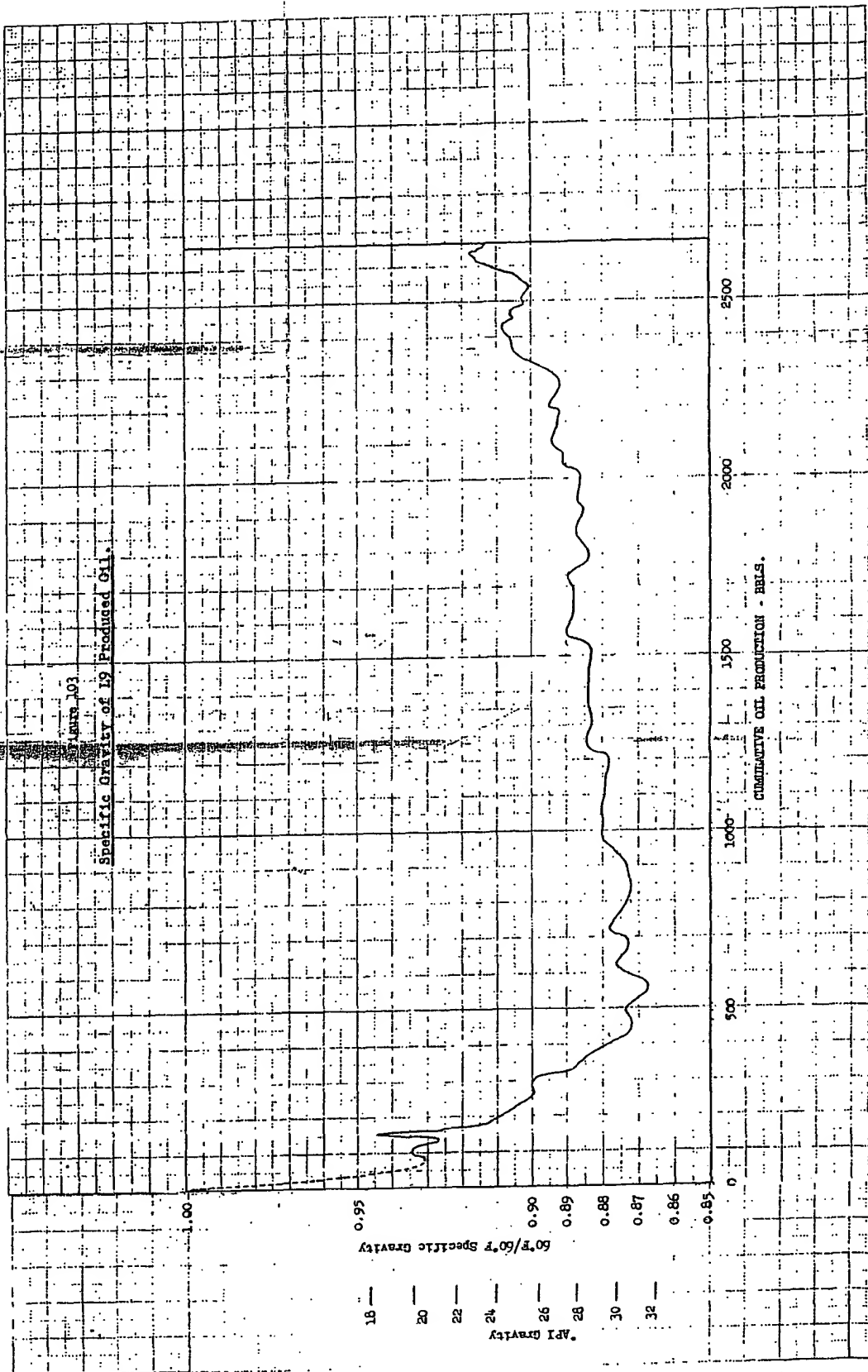
1950



19-507
3-25-59 BP

WELL NO. 103

Specific Gravity of L3 Produced Oil

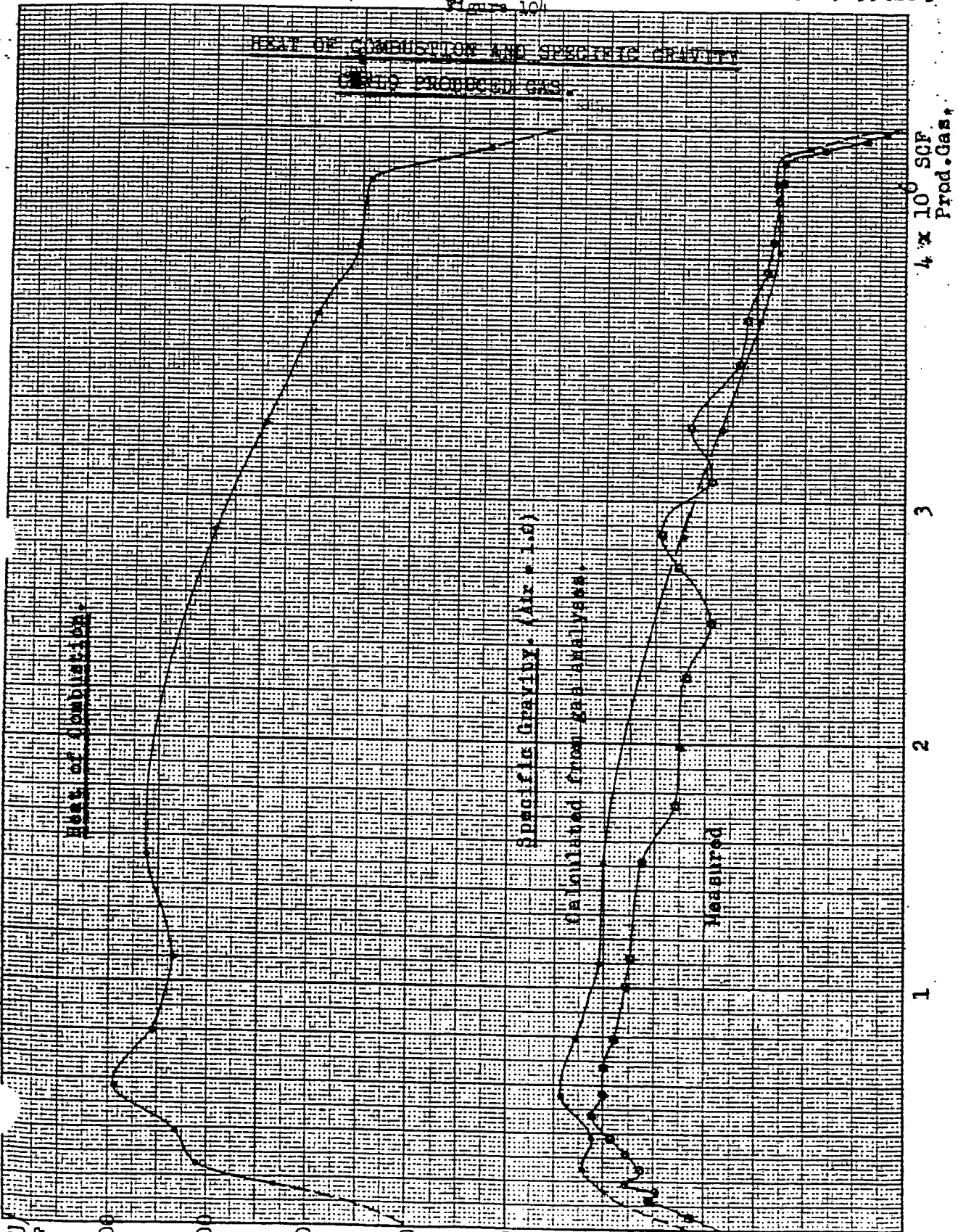


API Gravity

18 —
20 —
22 —
24 —
26 —
28 —
30 —
32 —

L9-509.
3.25.59.BP.

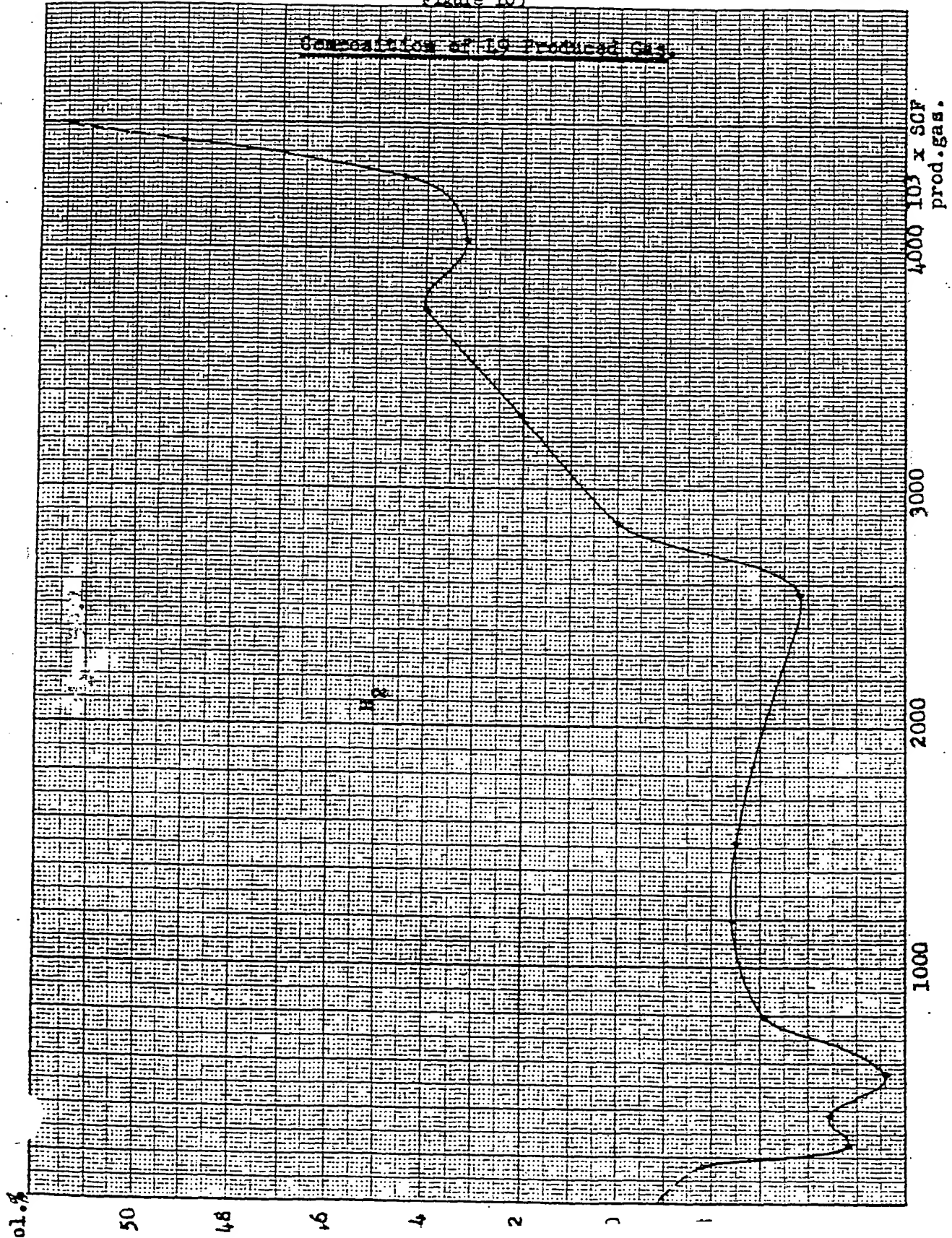
Figure 10



L9-508-1.
3.25.59.BP.

Figure 105

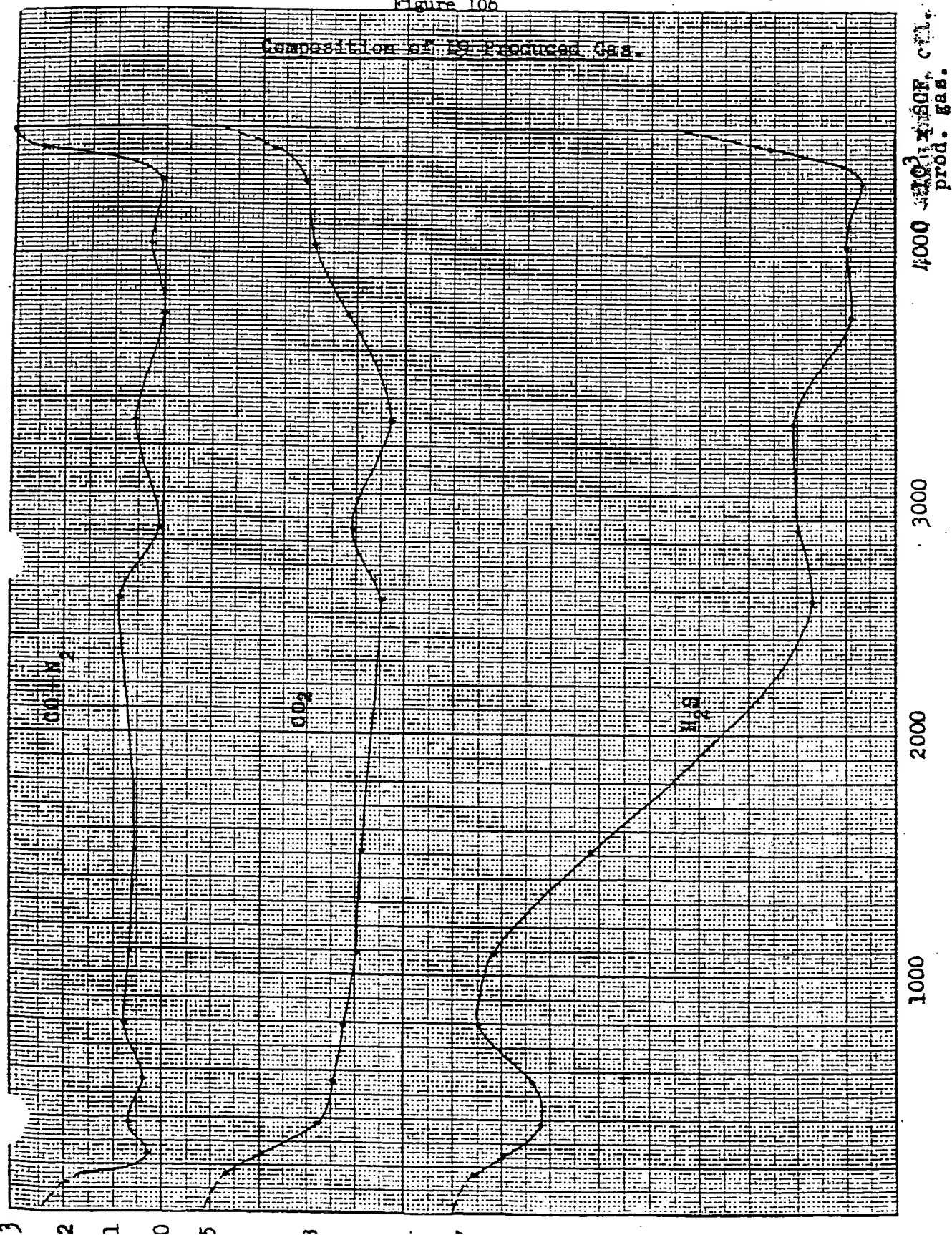
Comparison of L9 Produced Gas



L9-508-2.
3.25.59.BP.

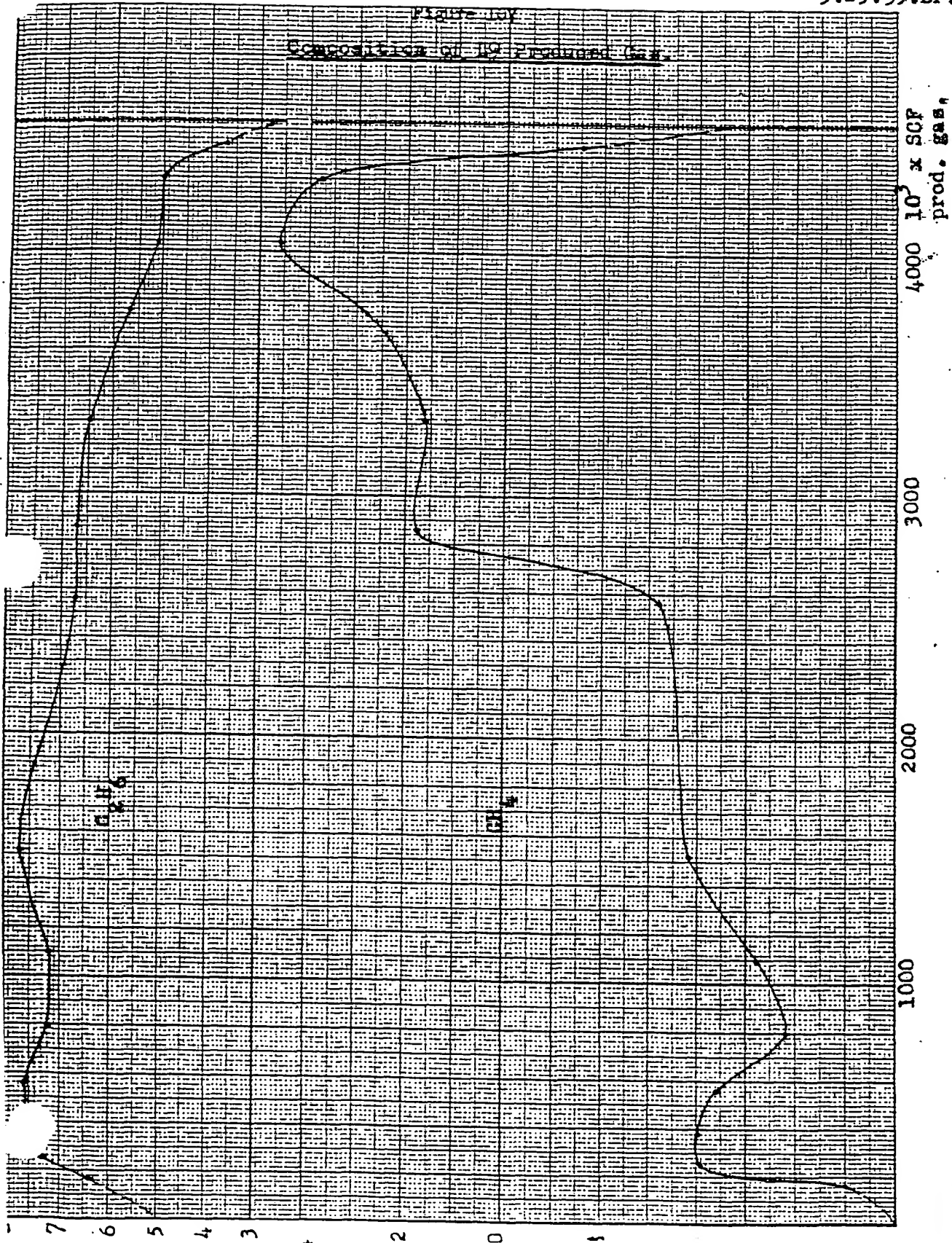
Figure 106

Composition of L9 Produced Gas.

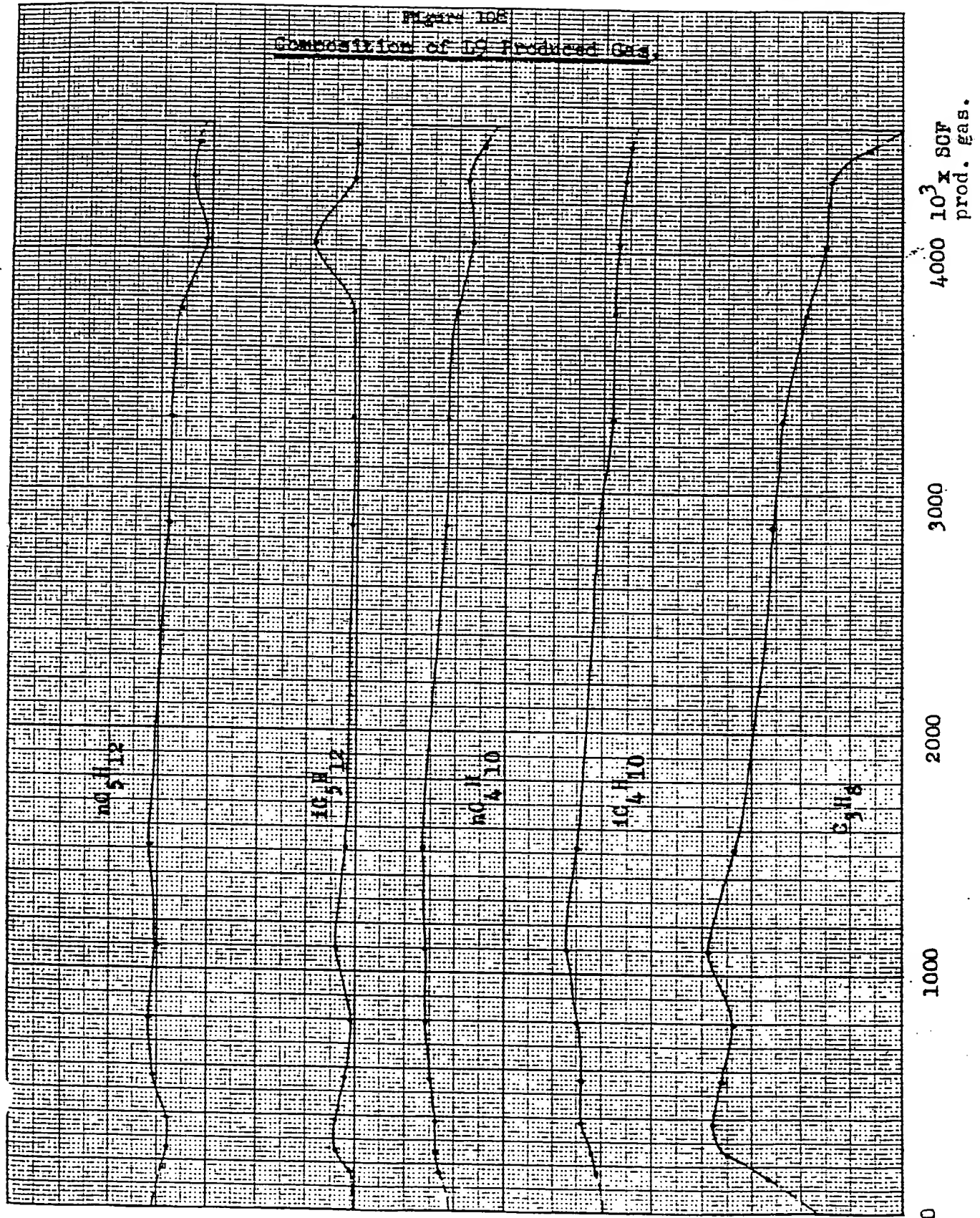


L9-508-3.
3.25.59.BP.

Figure 10
Composition of L9 Produced Gas



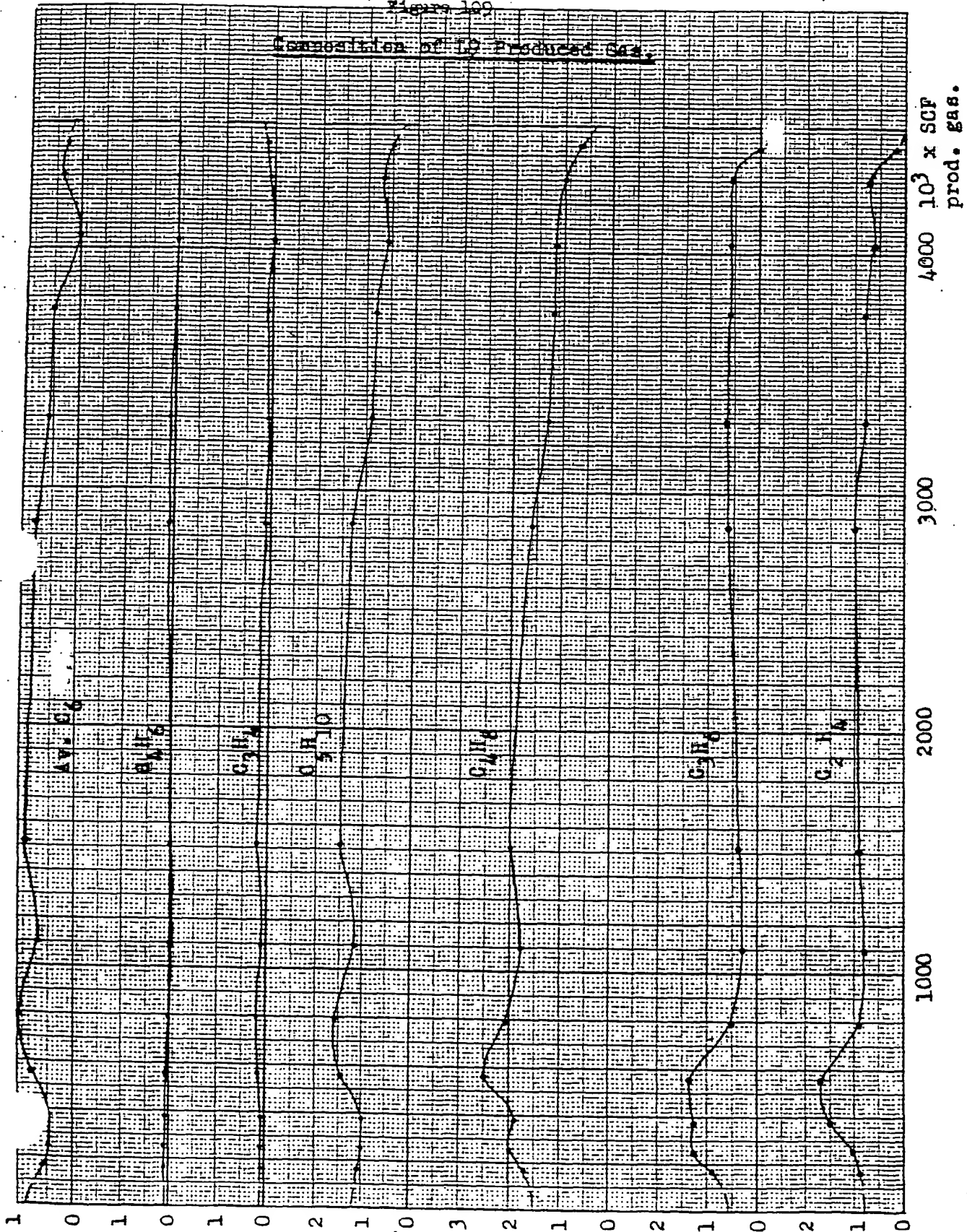
L9-508-4.
3.25.59.BP.



L9-508-5.
3.25.59.BP.

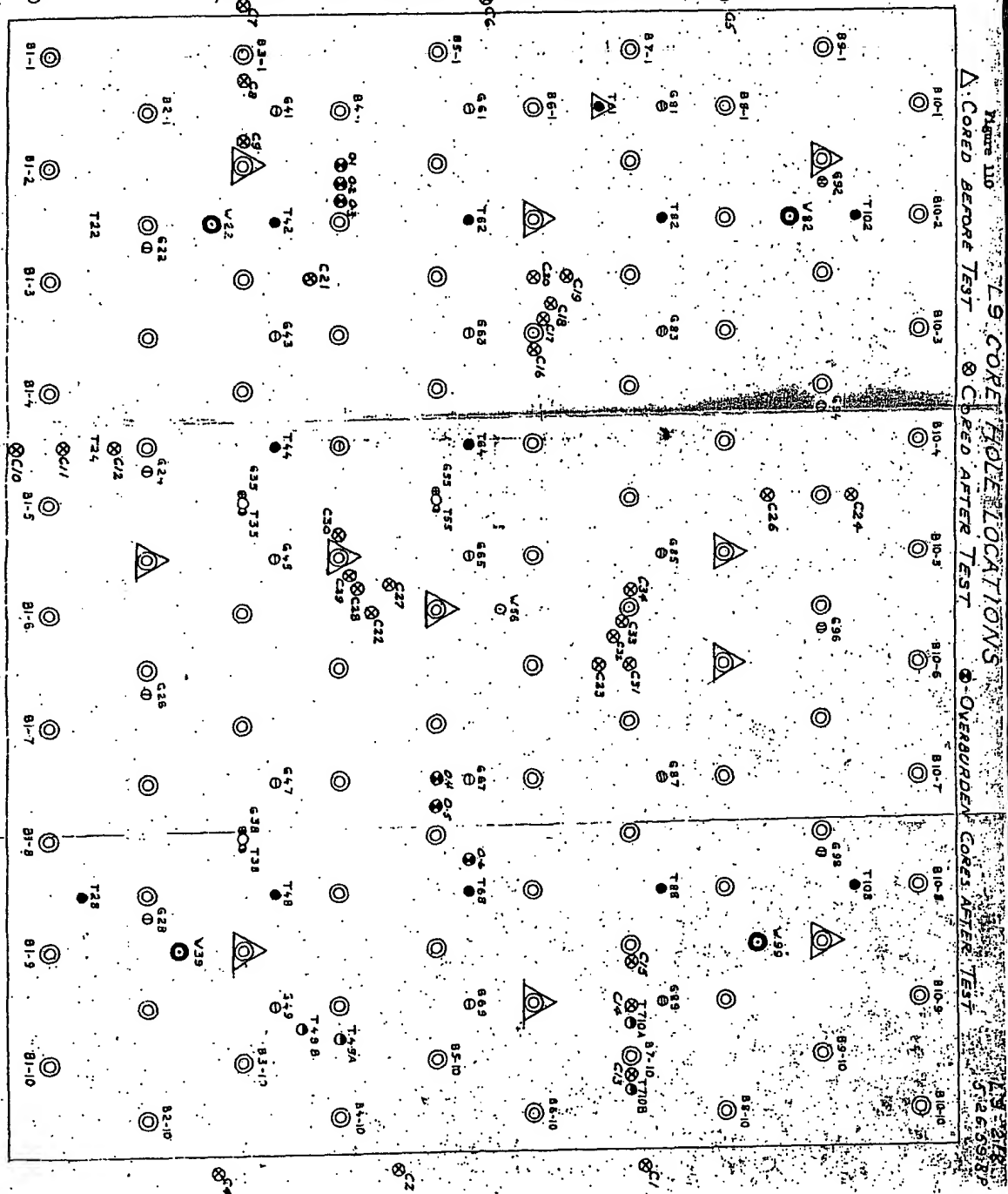
Figure 100

Composition of L₉ Produced Gas



L 9-101.
JAN. 21 1958. 8P
REVISED 3.15.58. 8P

- BURNER, 15' 5 $\frac{5}{8}$ " AND 40' 4 $\frac{3}{4}$ " HOLE, 52' 2 $\frac{1}{2}$ " CASING.
 ○ CONCENTRIC GASWELL AROUND BURNER, 13' 4 $\frac{30}{64}$ "-422" CASING.
 ● SEPARATE GASWELL IN BURNERHOLE, 15' 1 $\frac{1}{2}$ " CASING.
 ○ " " 2' FROM ADJACENT BURNER, 20' 3 $\frac{3}{4}$ " HOLE, 15' 1 $\frac{1}{2}$ " CASING.
 ○ " " 5'9"
 ○ " " 2'
 ○ " " 50' 3 $\frac{3}{4}$ " HOLE FILLED WITH GRAVEL TO 15' 15' 1 $\frac{1}{2}$ " CASING.
 ○ " 5'9"
 ○ CONCENTRIC GASWELL AROUND WATER WELL, 15' 4 $\frac{50}{64}$ "-422" CASING.
 ○ WATER WELL, 5'9" FROM ADJ. BURNER, 55' 5 $\frac{5}{8}$ " HOLE, 50' 1 $\frac{1}{2}$ " TUBING WSG; 75' 5 $\frac{5}{8}$ " HOLE, 40' 3 $\frac{1}{2}$ " AND 10' 4" TUBING.
 ○ TEMPERATURE WELL, 5'9" FROM ADJACENT BURNER, 55' 3 $\frac{3}{4}$ " HOLE, 52' 2" CASING.
 ○ " IN BURNERHOLE, 52' 1" CASING.
 ○ " 3' (T49B 4') FROM ADJACENT BURNER, 55' 3 $\frac{3}{4}$ " HOLE, 52' 2" CASING.



L9 CORE HOLE LOCATIONS
Figure 110

| <u>Core Hole No.</u> | <u>Locations</u> |
|--------------------------|---|
| C1 | 10' N. of B7-10 then 1' west |
| C2 | 10' N. of B5-10 then 4' - 4" west |
| C3 | 7' N. of C2 |
| C4 | 10' N. of B3-10 then 2' - 4" east |
| C5 | 10' S. of B8-1 |
| C6 | 10' S. of B6-1 then 4' - 4" east |
| C7 | 5' S. of B3-1 |
| C8 | 2' N. of B3-1 (between B3-1 and B3-2) |
| C9 | 2'-3-1/2" S. of B3-2 (-") |
| C10 | 11'-5-1/2" E. of B2-4 |
| C11 | 7'-10-1/2" E. of B2-4 |
| C12 | 3'-8" E. of B2-4 (between B2-4 and T24) |
| C13 | 1'-5" N. of B7-10 |
| C14 | 4'-6" S. of B7-10 (between B7-10 and B7-9) |
| C15 | 1'-1-1/2" N. of B7-9 (-") |
| C16 | 10" N. of B6-3 |
| C17 | 1'-5" from B6-3 towards B7-2 |
| C18 | 2'-11" " " " " |
| C19 | 5'-9" " " " " (between B6-2, 6-3, 7-3) |
| C20 | 5' S. of B6-3 (between B6-2 and B6-3) |
| C21 | Midway between B3-3, B4-2, and B4-3 |
| C22 | " " B4-5, B4-6, and B5-6 |
| C23 | " " B6-6, B7-6, and B7-8 |
| C24 | 2'-5-1/2" west of B9-5 |
| C25 | 3'-5" east of B9-5 |

L9 CORE HOLE LOCATIONS
Figure 110

| <u>Core Hole No.</u> | <u>Locations</u> |
|--------------------------|------------------------------------|
| C26 | 4'-5" east of B9-5 |
| C27 | 5' from B4-5 between B4-5 and B5-6 |
| C28 | 2'-11" from B4-5 towards B5-7 |
| C29 | 1'-5" " " " " |
| C30 | 11" " " " B4-4 |
| C31 | 5' from B7-6 between B7-6 and B7-7 |
| C32 | 2'-11" from B7-6 towards B6-7 |
| C33 | 1'-5" " " " " |
| C34 | 10" to 12" from B7-6 towards B7-5 |
| C35 | 14'-7-1/2" east of B2-4 |

Figure 111

L9-215-1
5-19-59 RH

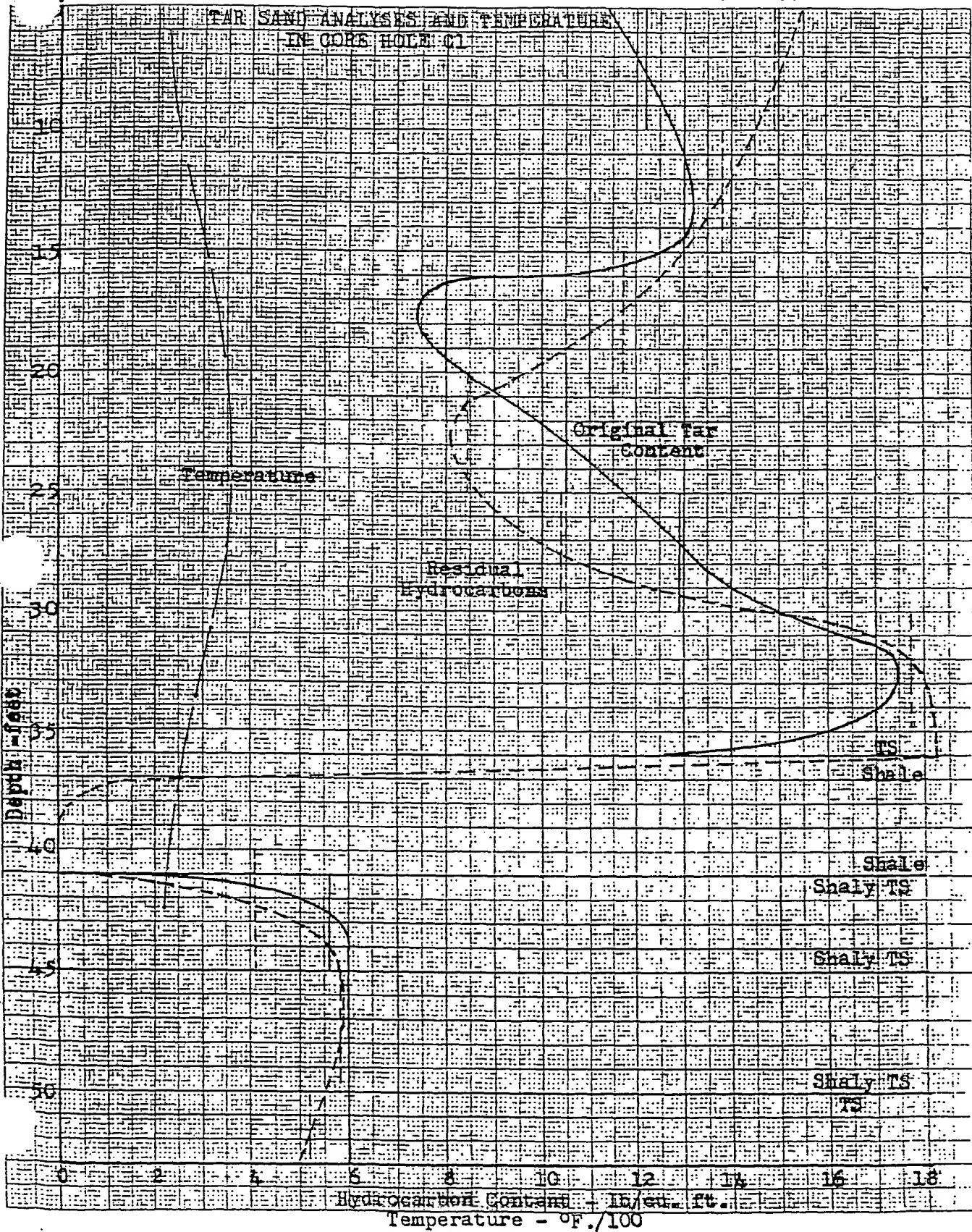


Figure 112

L9-215-2
5-21-59 RH

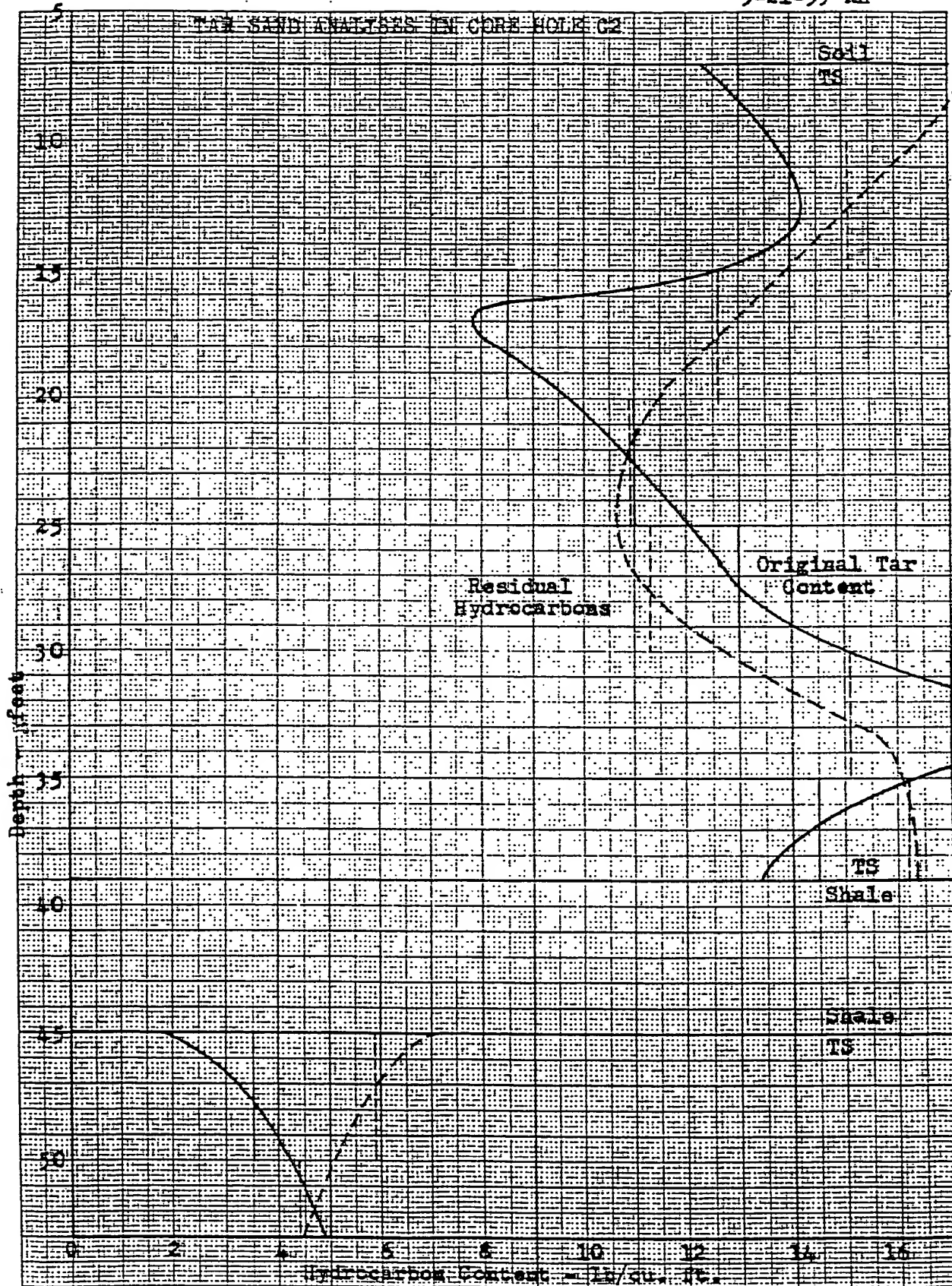


Figure 113

TAR SAND ANALYSES IN CORE HOLE C3

19-215-3

5-21-59 RH

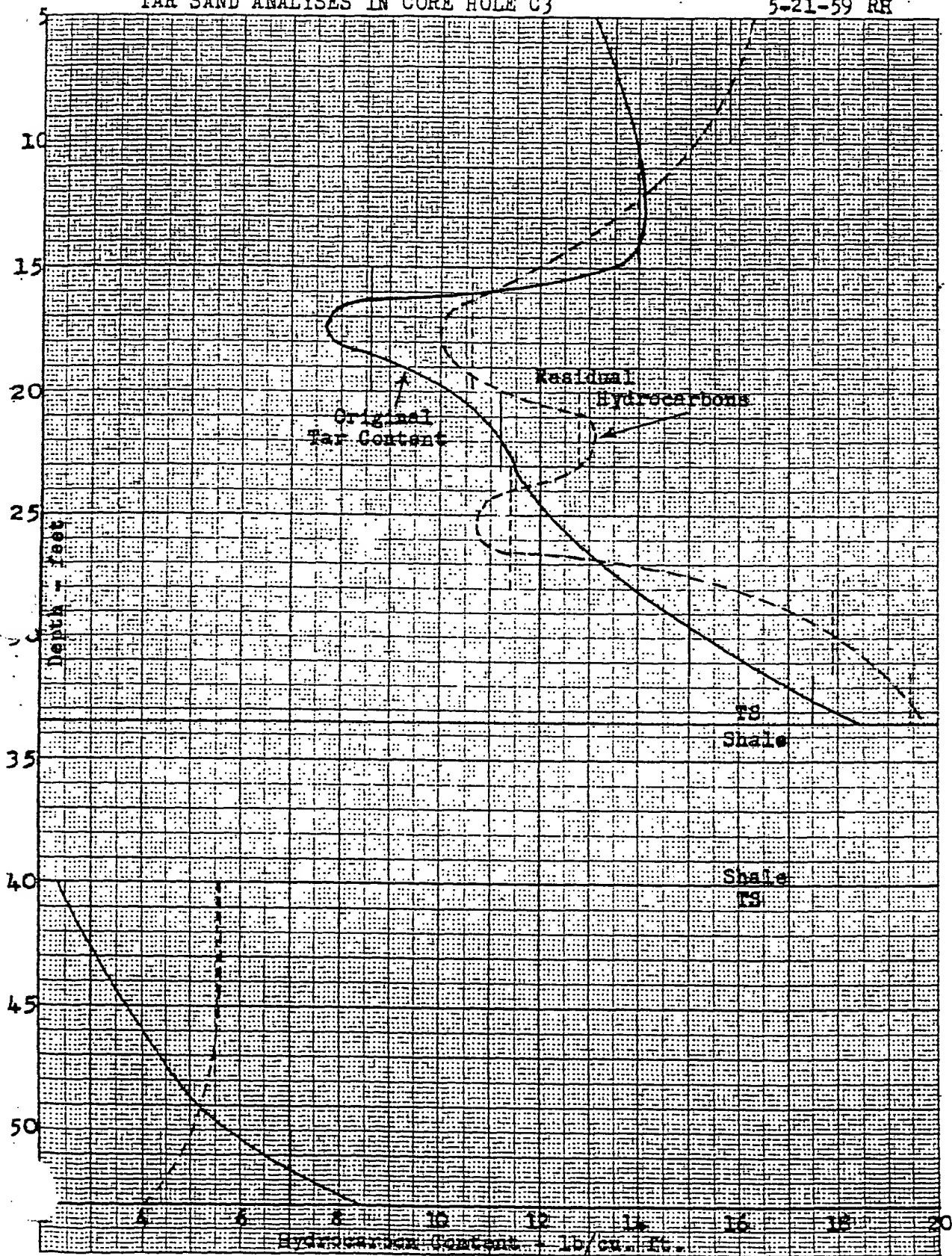
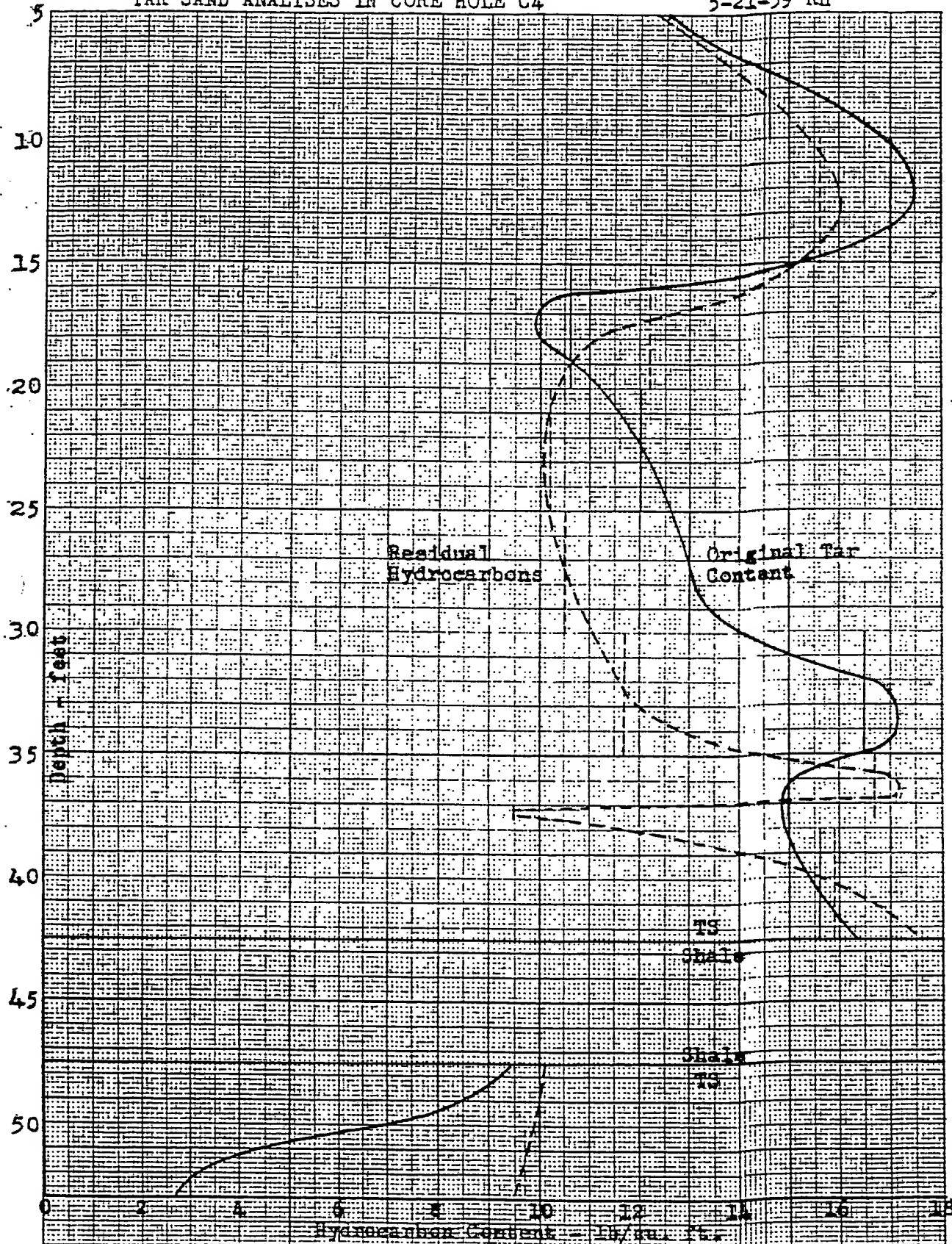


Figure 114

TAR SAND ANALYSES IN CORE HOLE C4

L9-215-4
5-21-59 RH



L9-215-5
5-21-59 RH

Figure 115

TAR SAND ANALYSES IN CORE HOLE C5

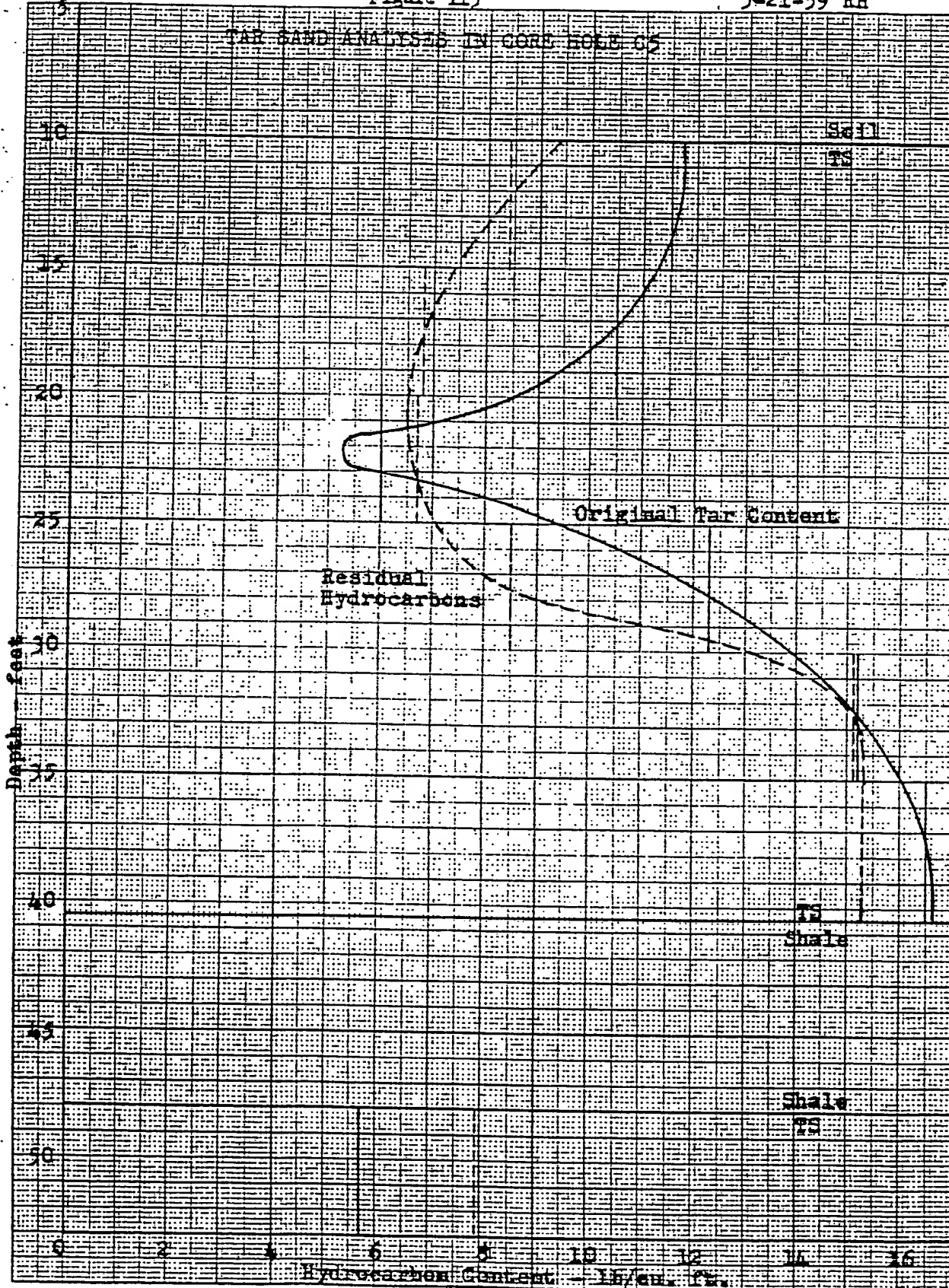


Figure 116

L9-215-6
5-21-59 RH

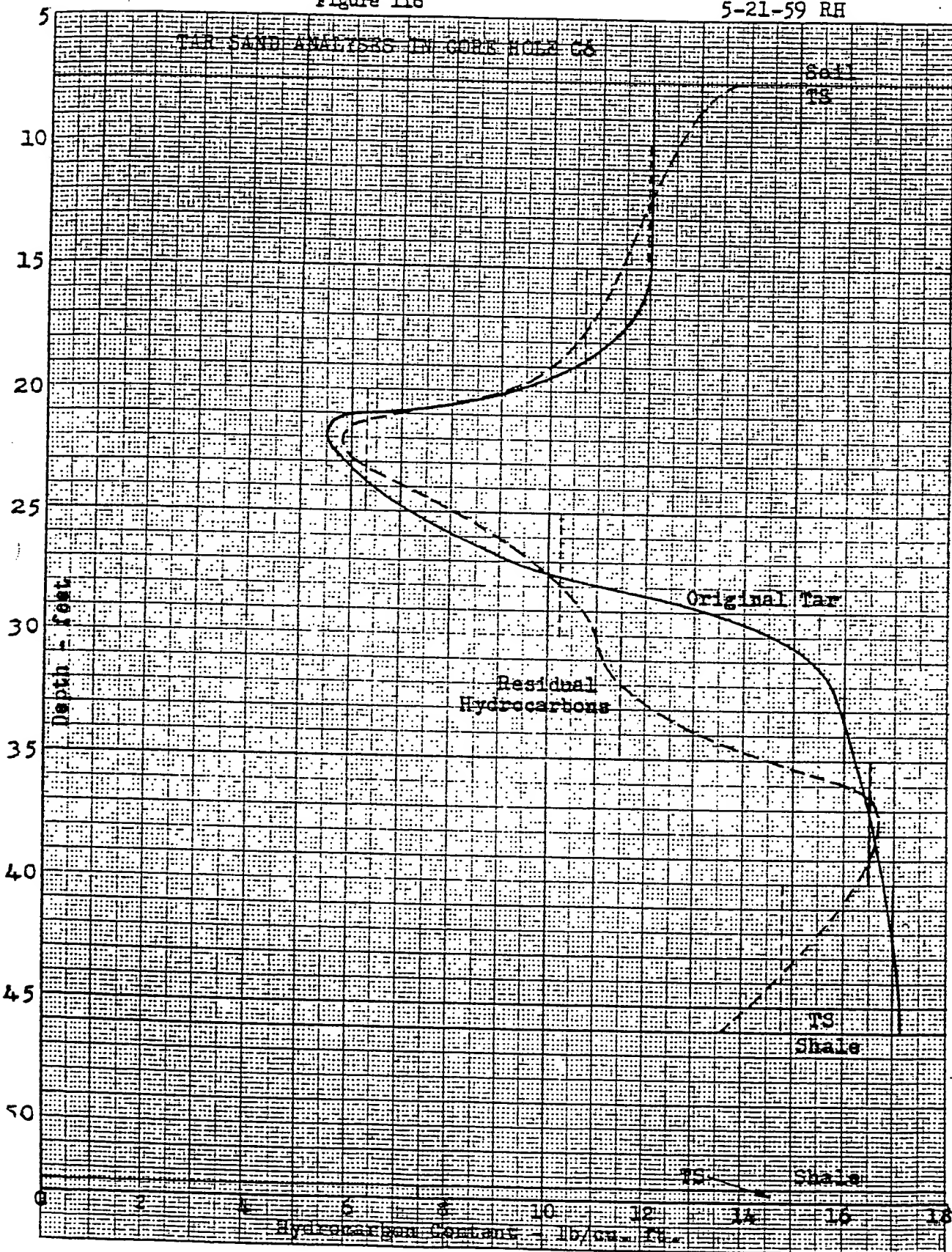


Figure 117

L9-215-7
5-21-59 RH

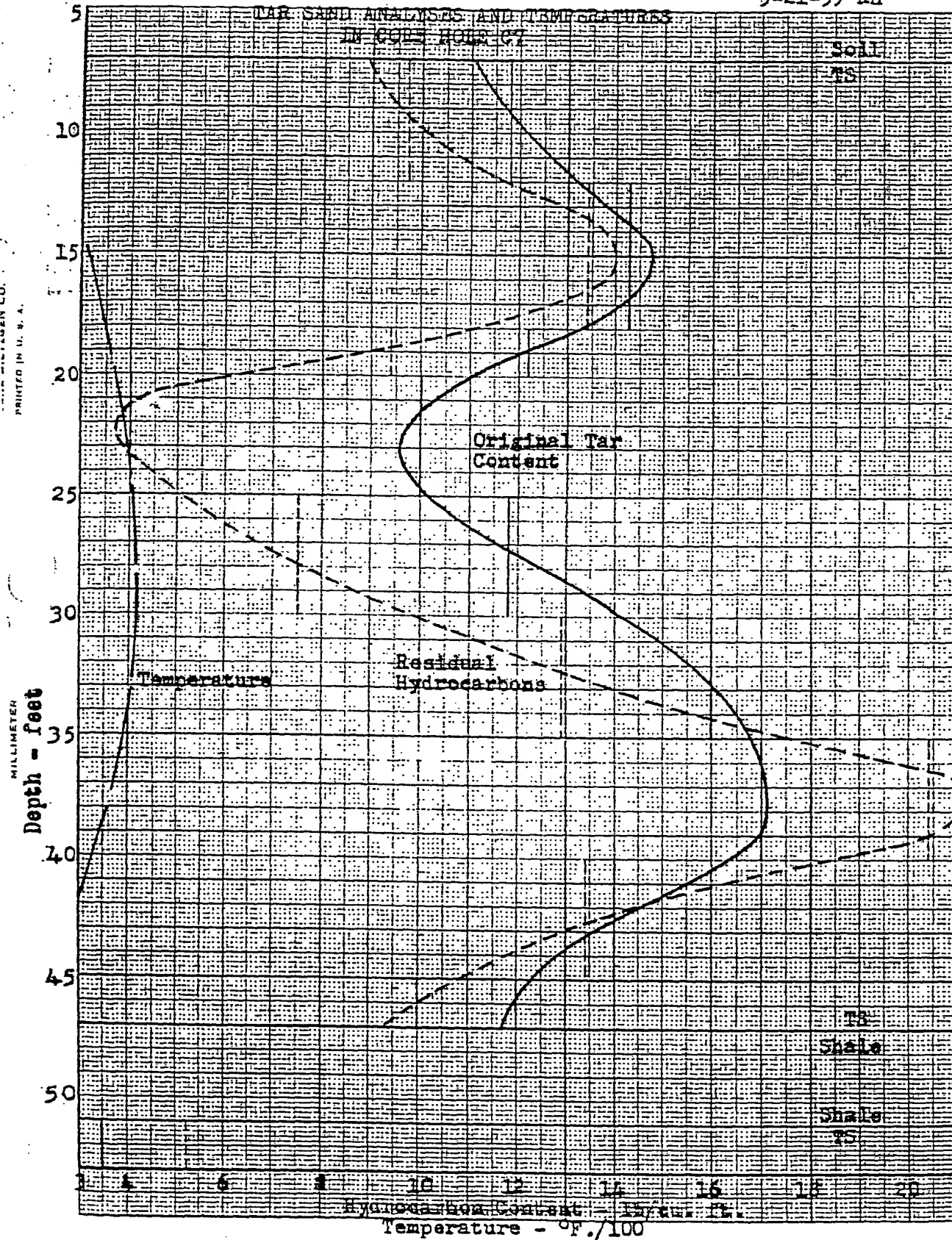


Figure 118

L9-215-8
5-21-59 RH

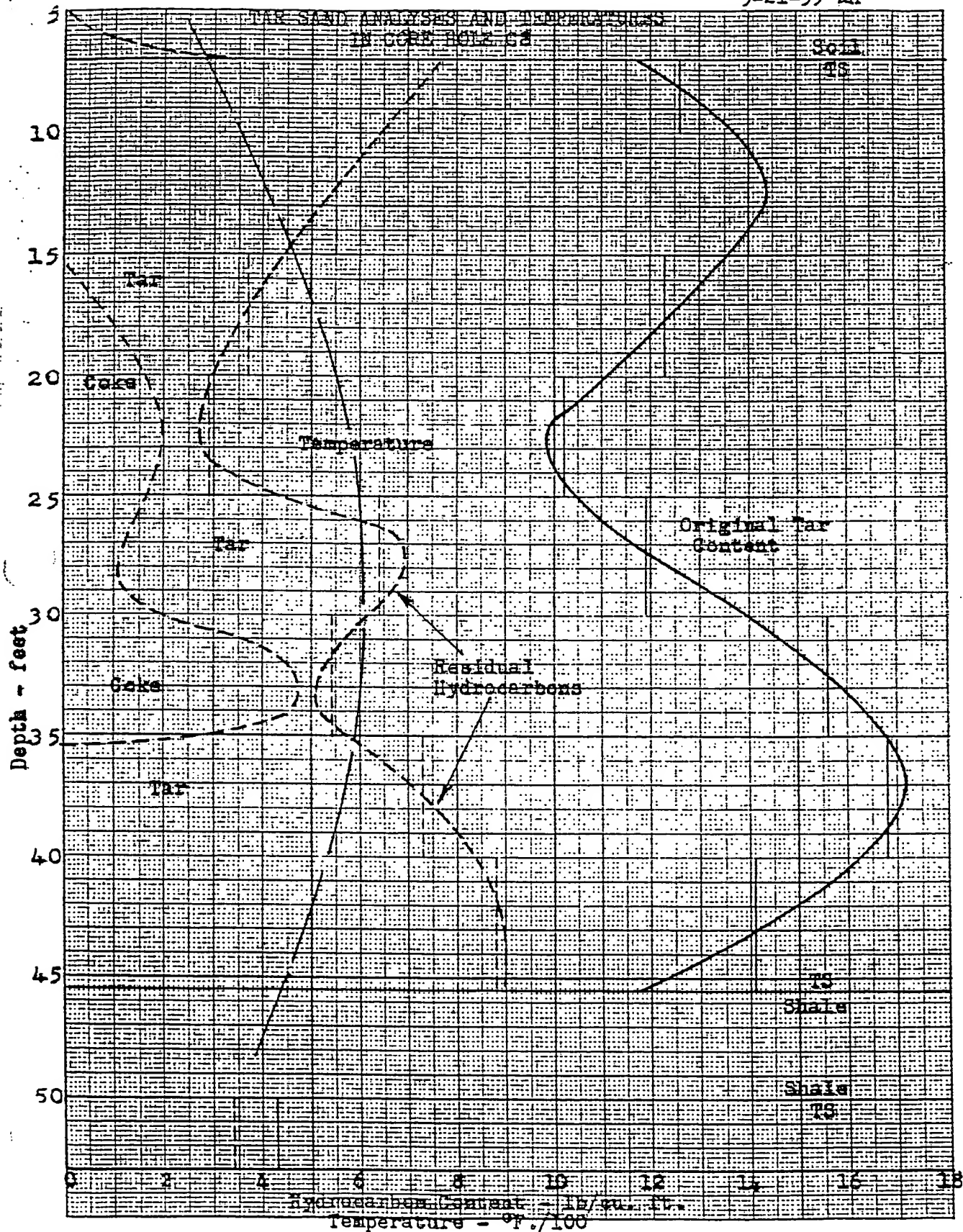


Figure 119

L9-215-9
5-25-59 RH

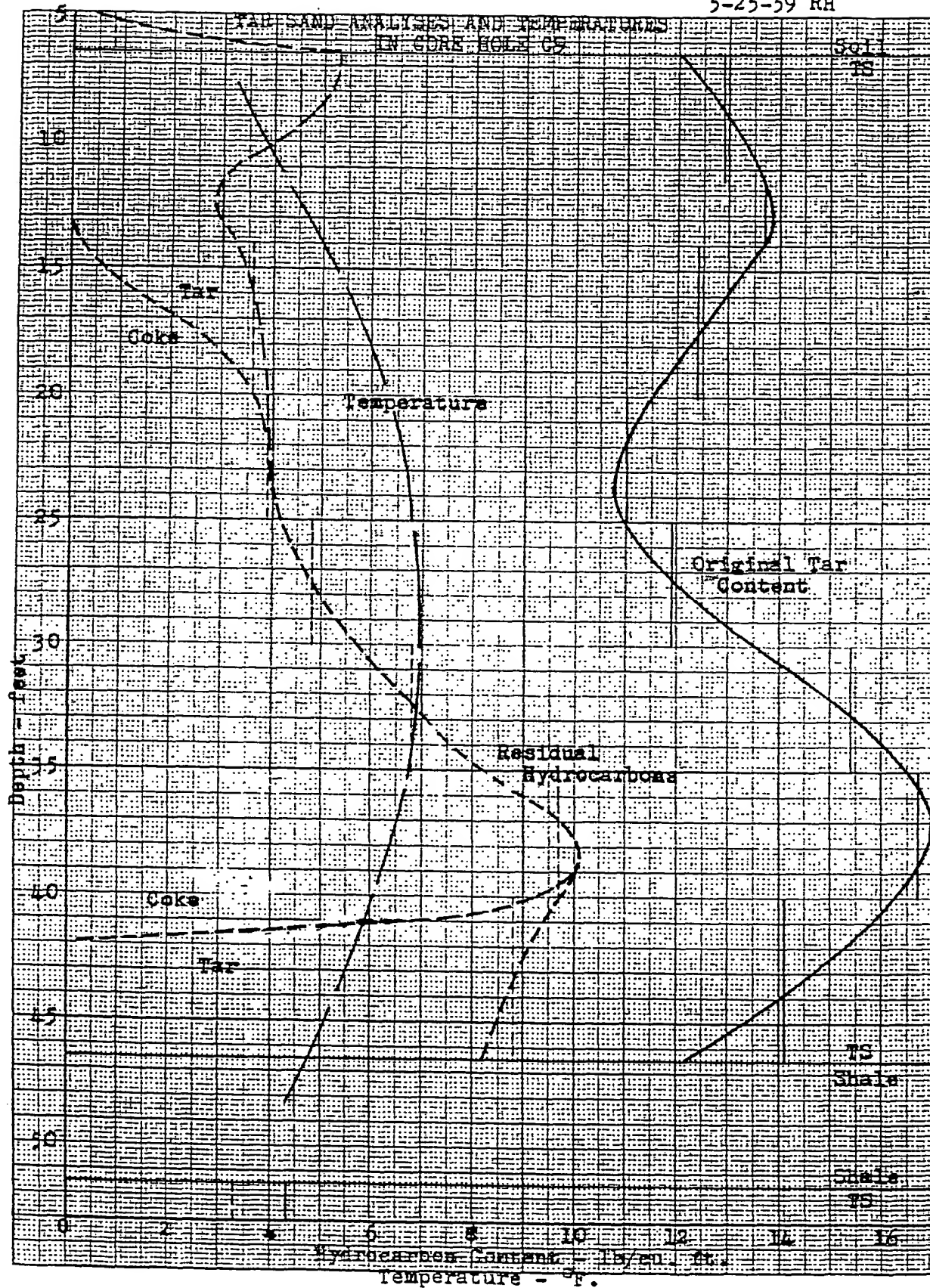


Figure 120

L9-215-10
5-19-59 RH

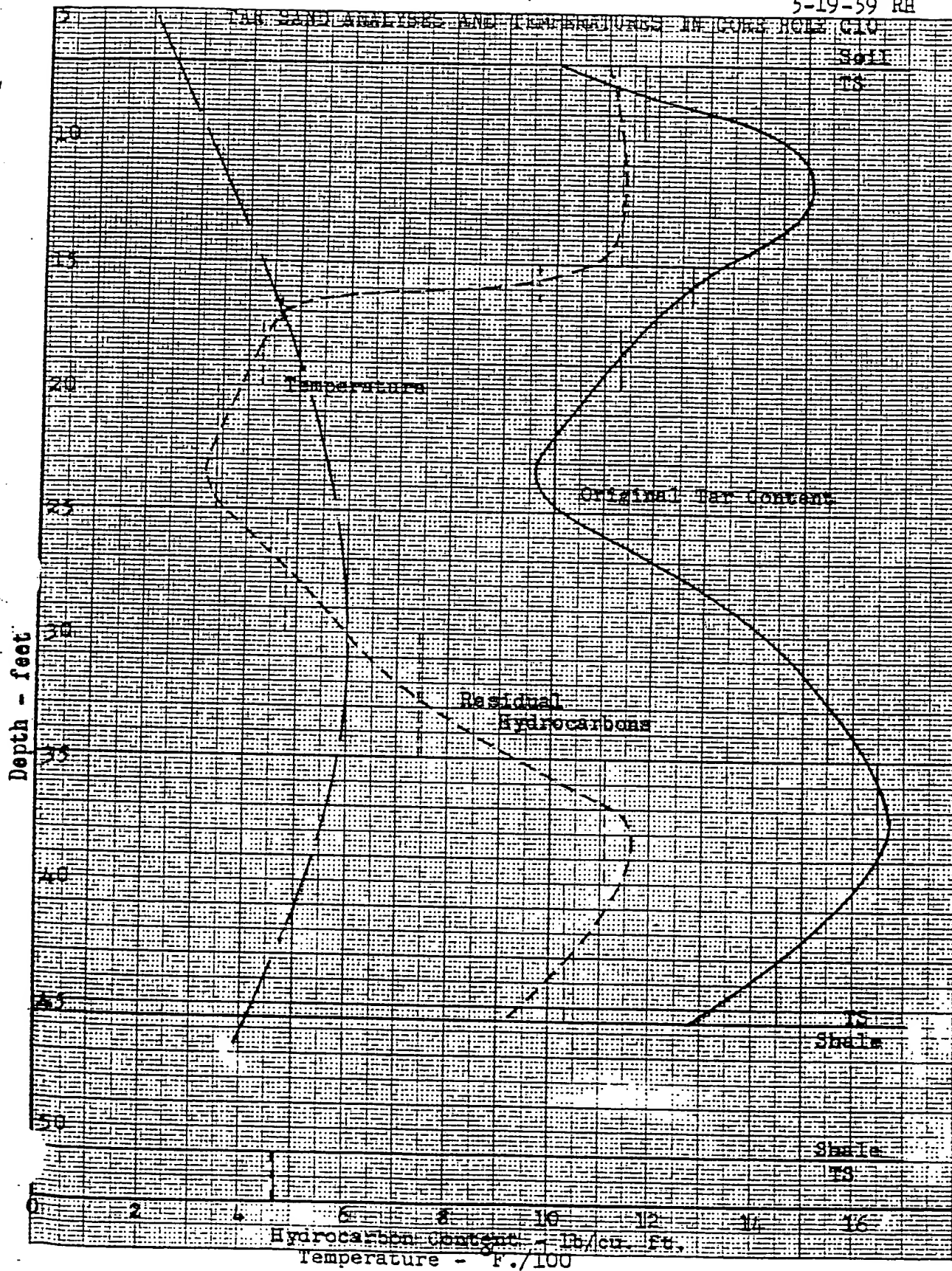


Figure 121

L9-215-11
5-19-59 RH

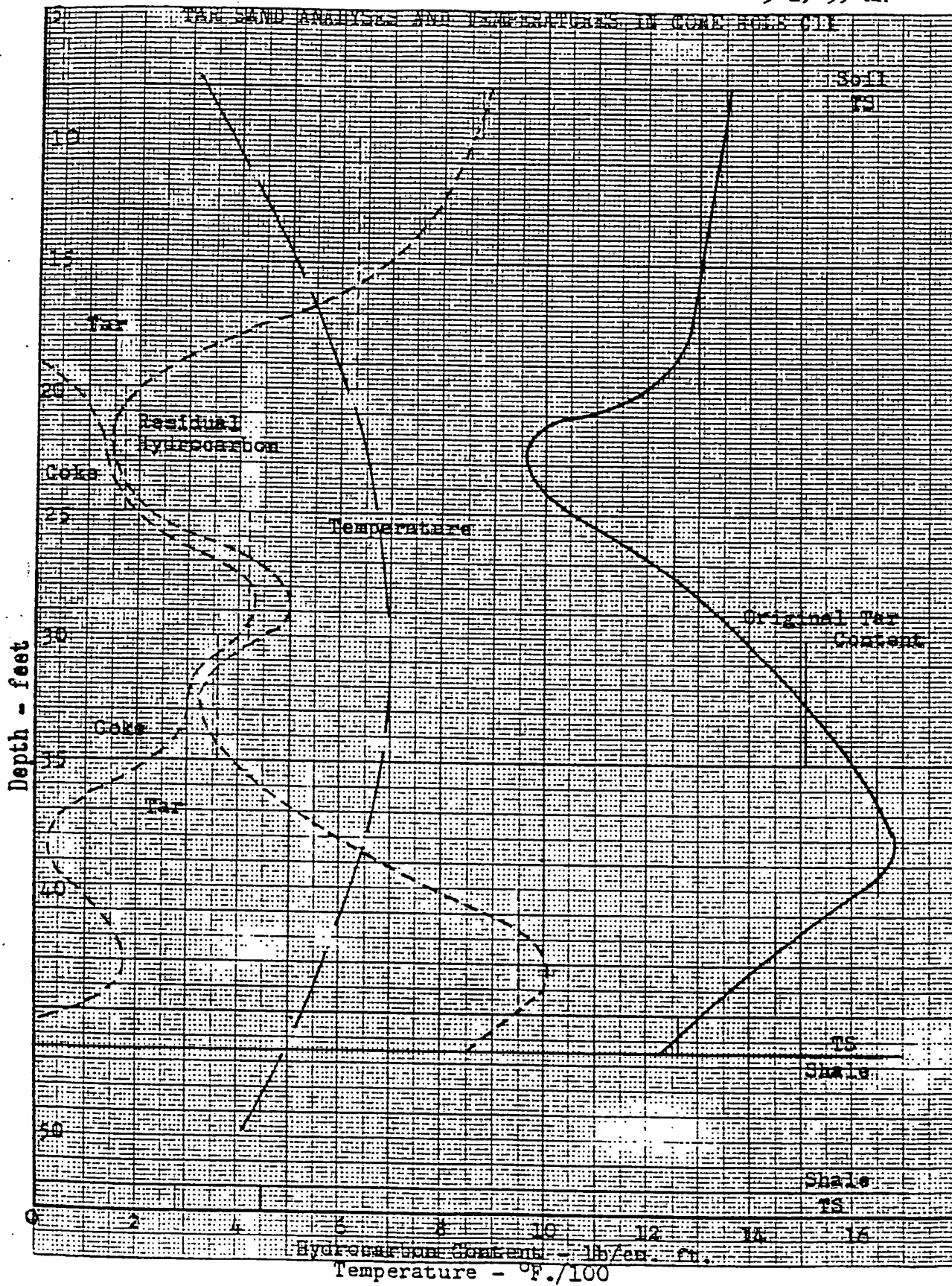


Figure 122

L9-215-12
5-27-59 RH

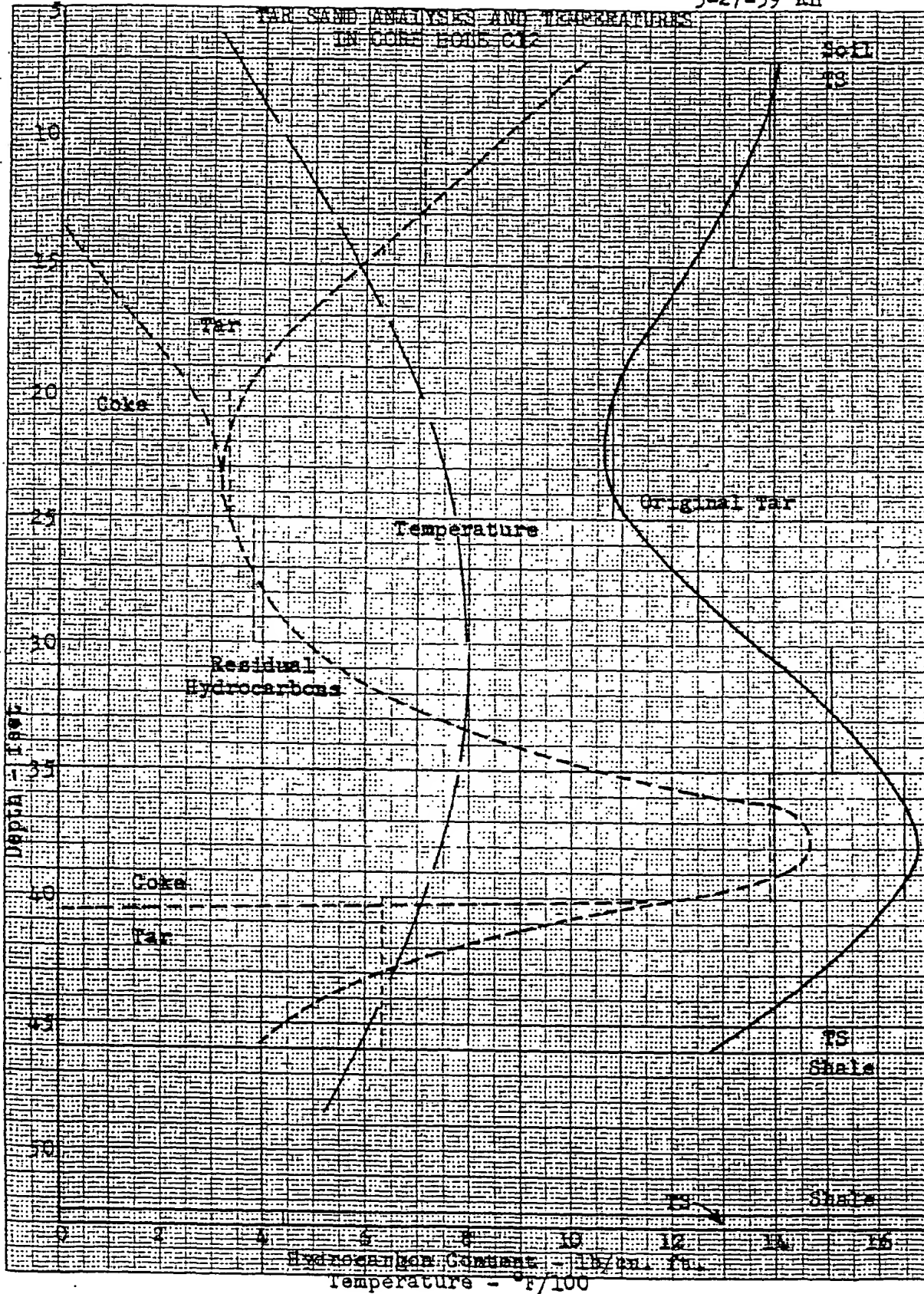


Figure 123
TAR SAND ANALYSES AND TEMPERATURES

L9-215-13
5-19-59 RH

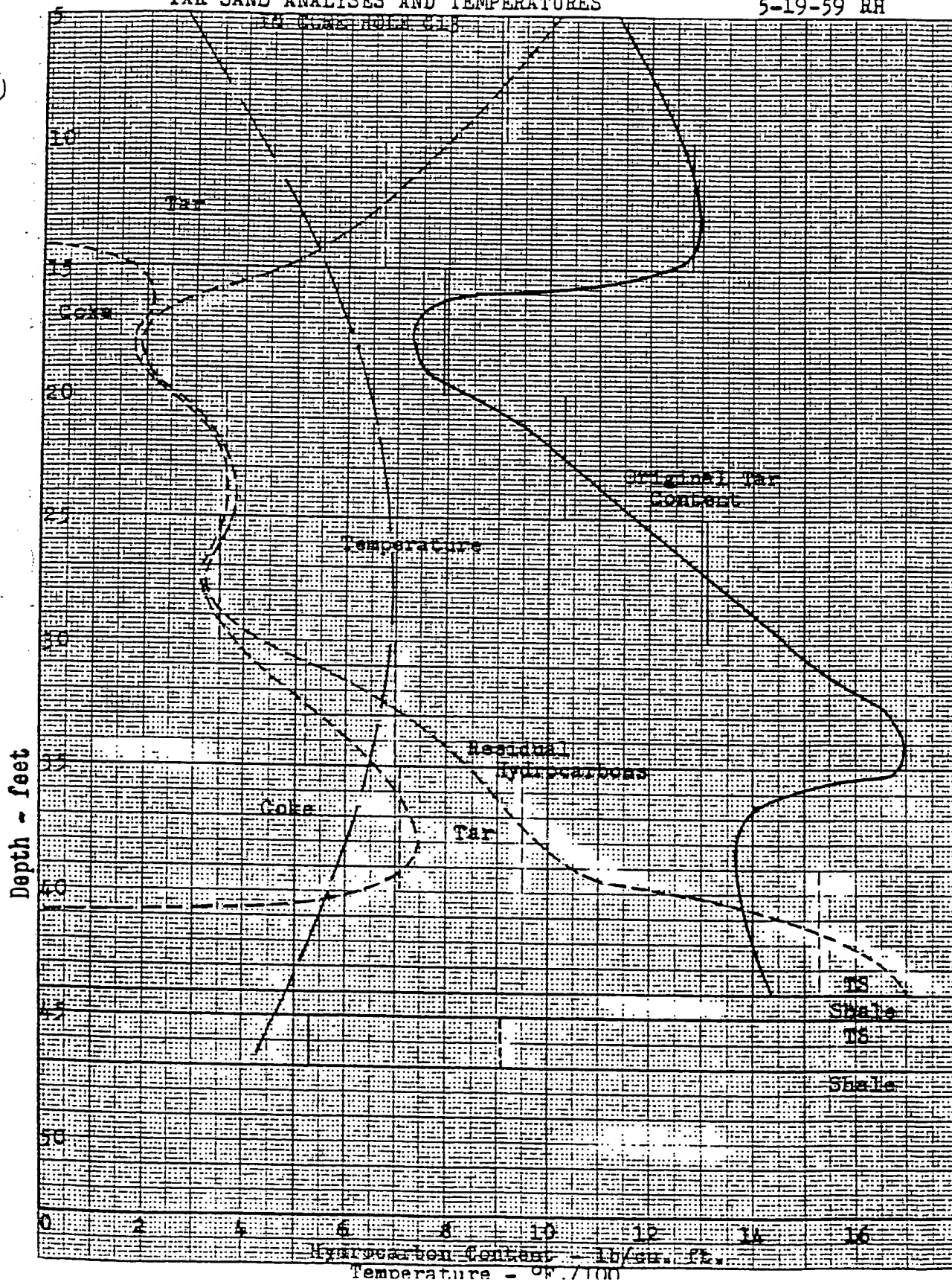


Figure 124

L9-215-14
5-19-59 RH

TAR SAND ANALYSES AND TEMPERATURES IN CORE HOLE C14

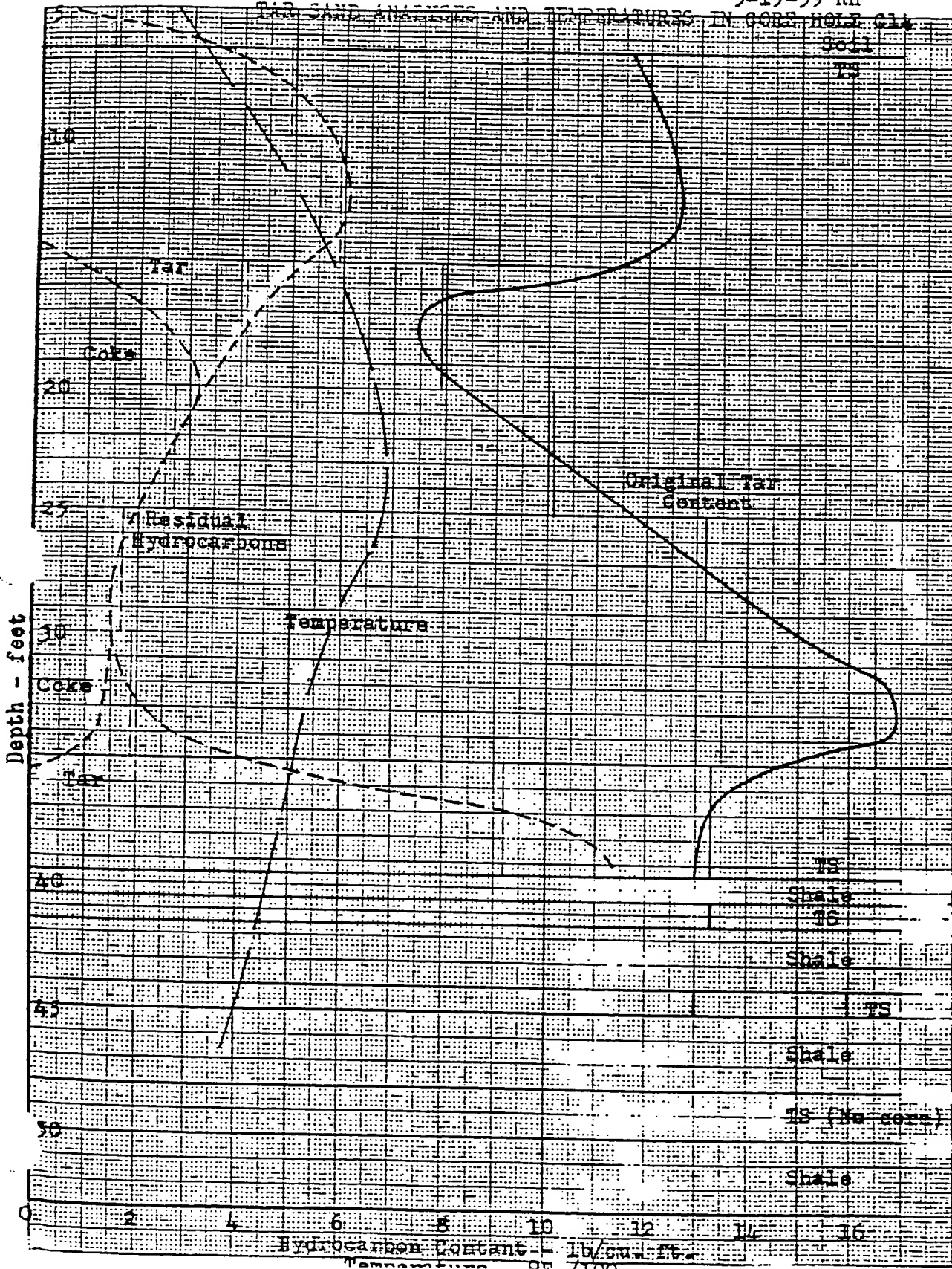


Figure 125

L9-215-15
5-27-59 RH

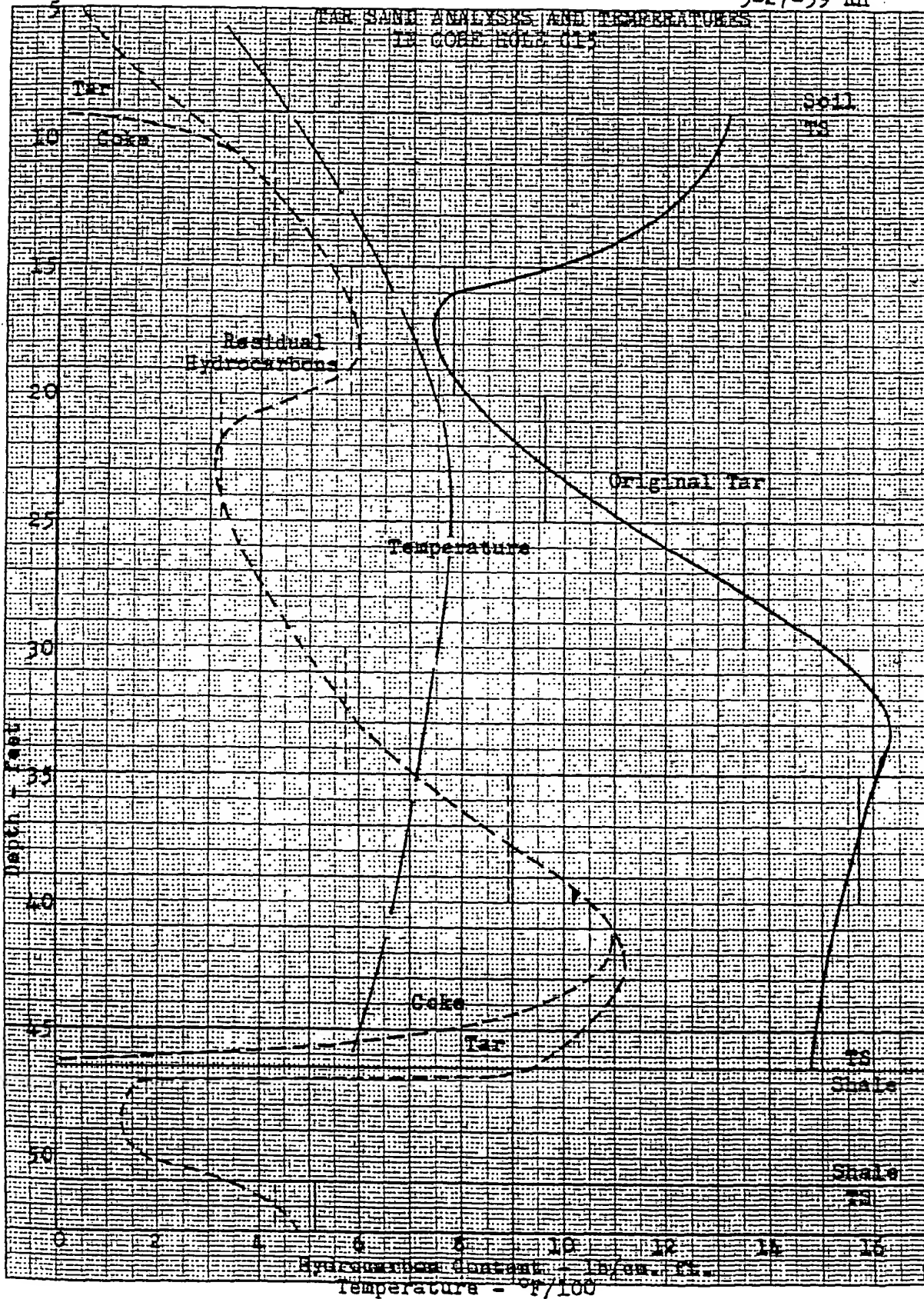


Figure 126

L9-215-16
5-14-59 RH

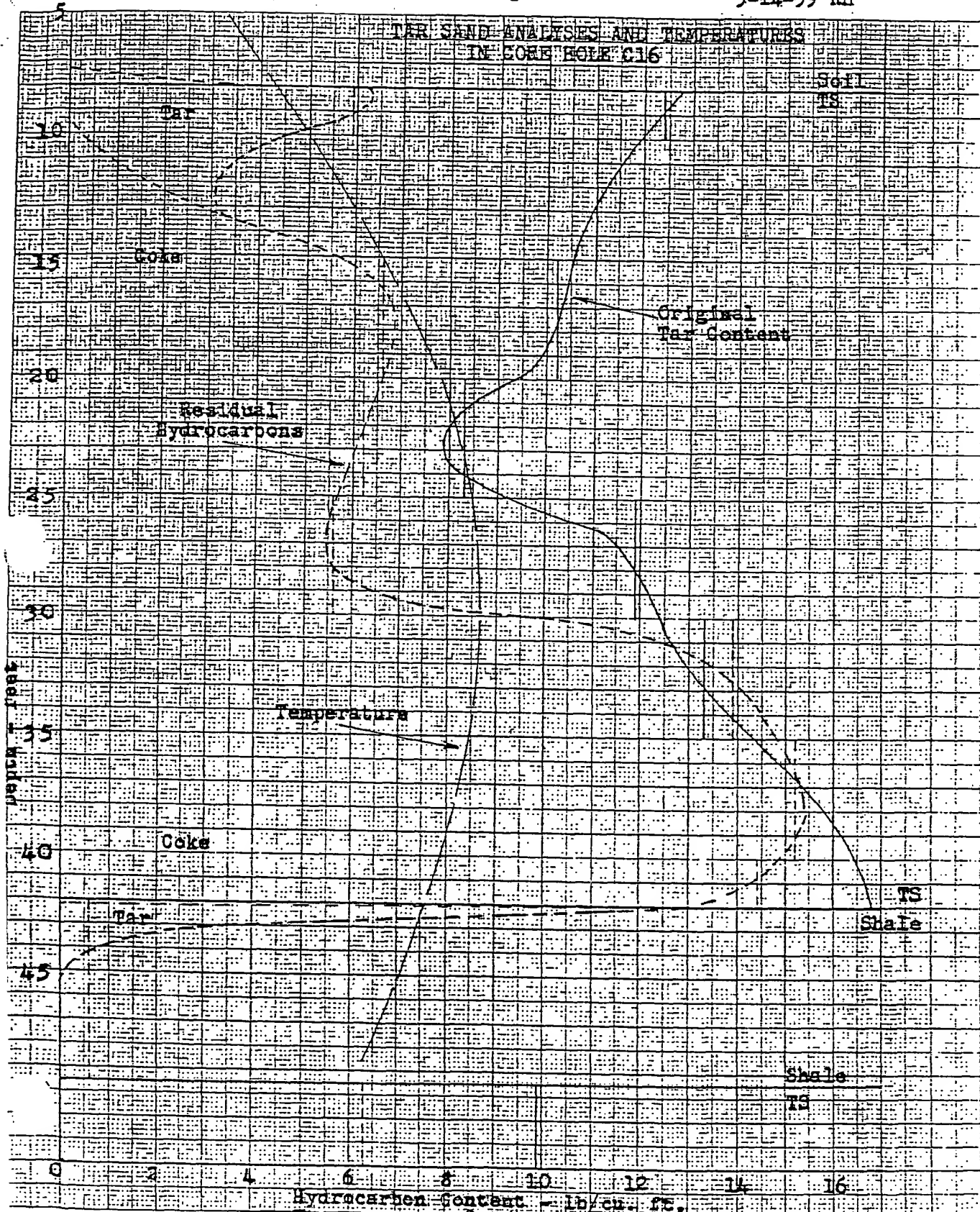


Figure 127

L9-215-17
5-18-59 RH

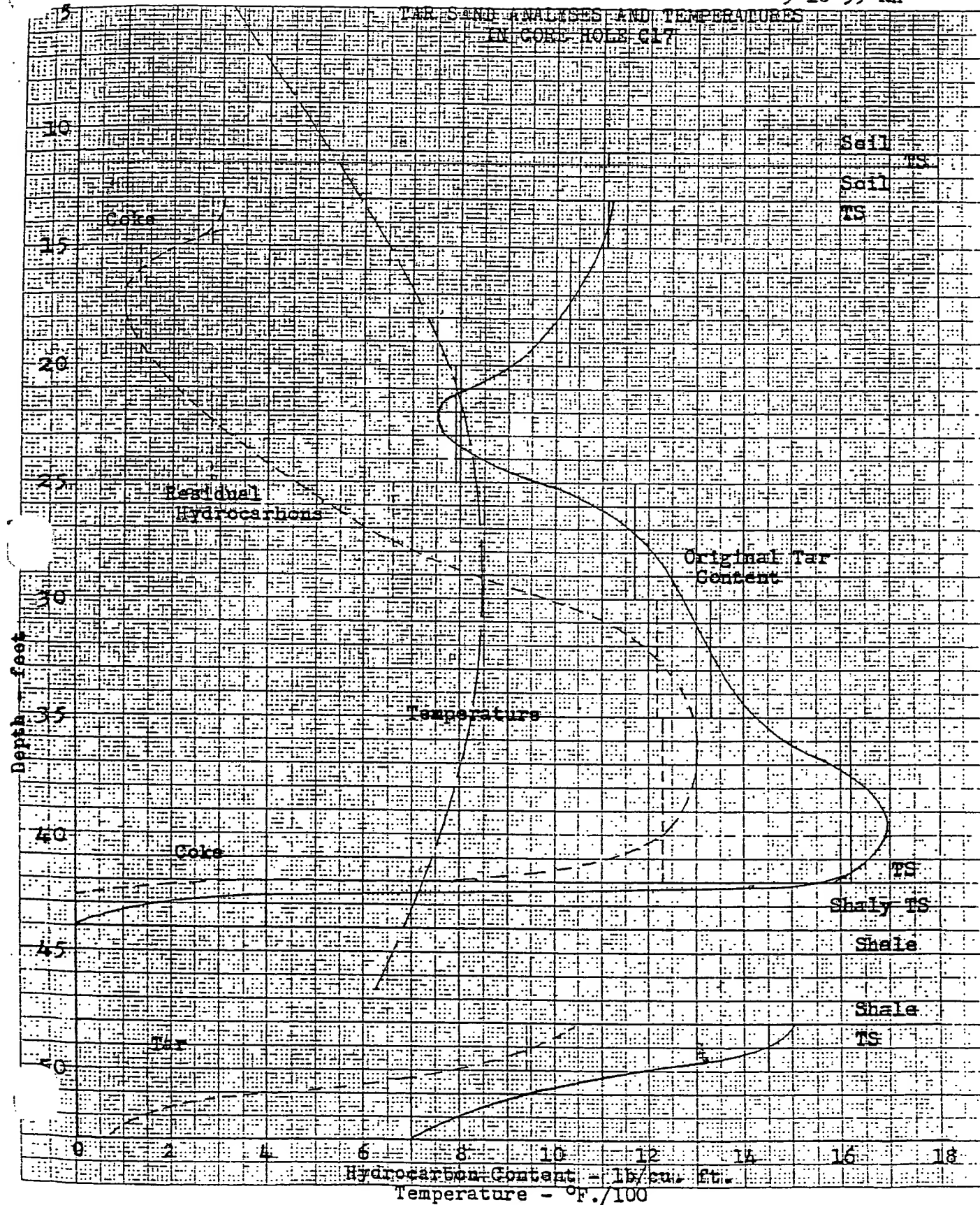


Figure 128

L9-215-18
5-18-59 RH

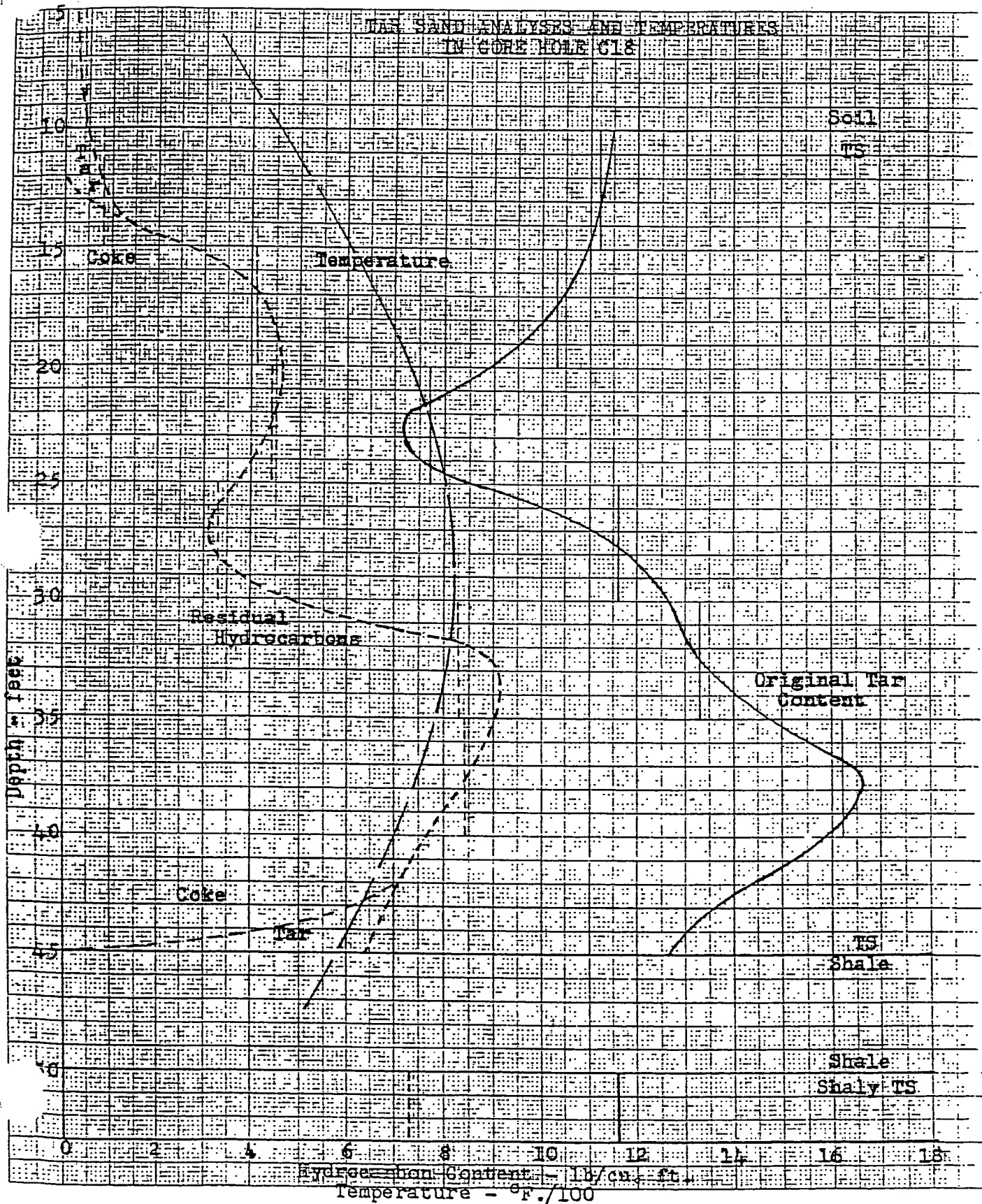


Figure 129

L9-215-19
5-18-59 RH

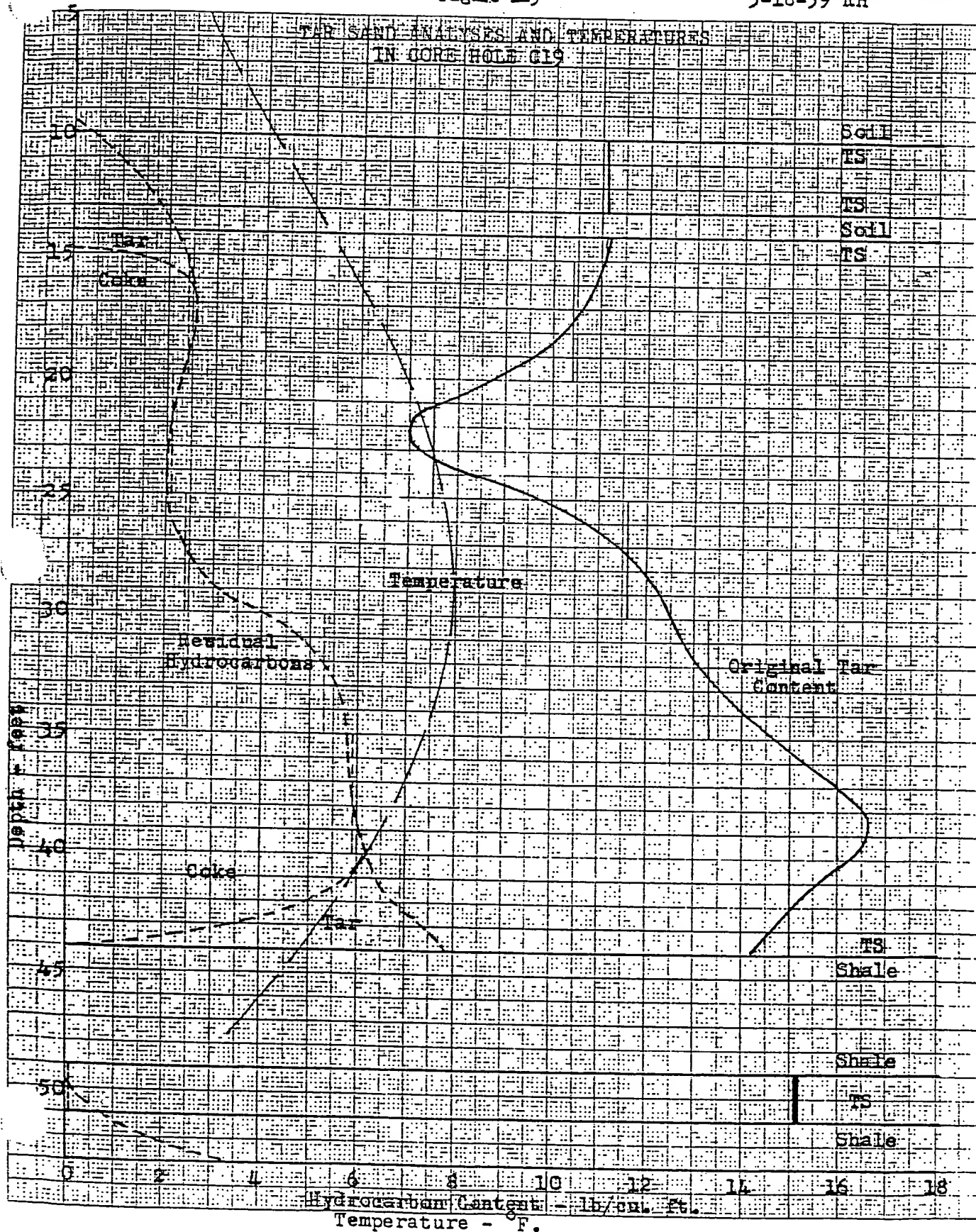


Figure 130

I9-215-20
5-18-59 RH

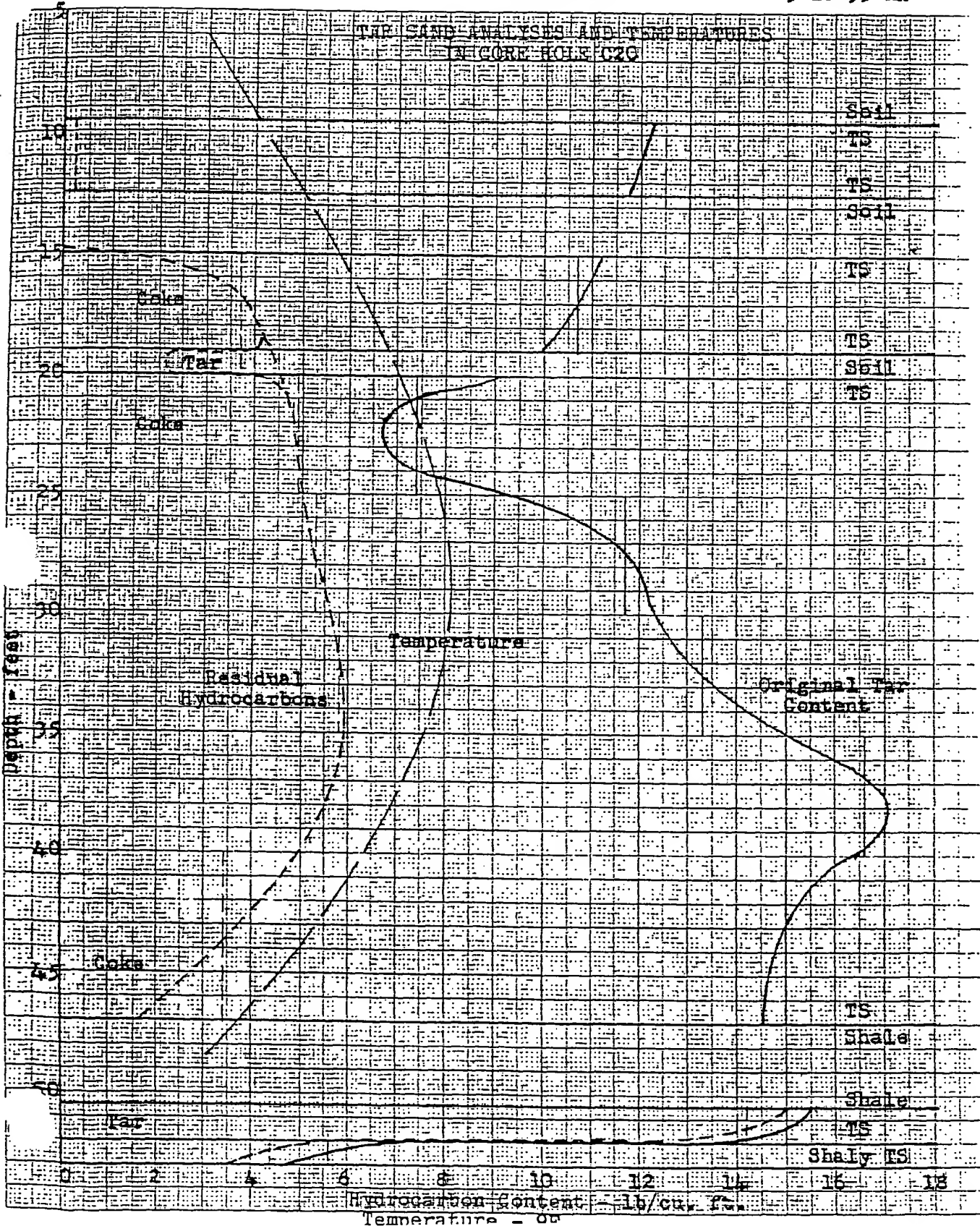


Figure 131

L9-215-21
5-18-59

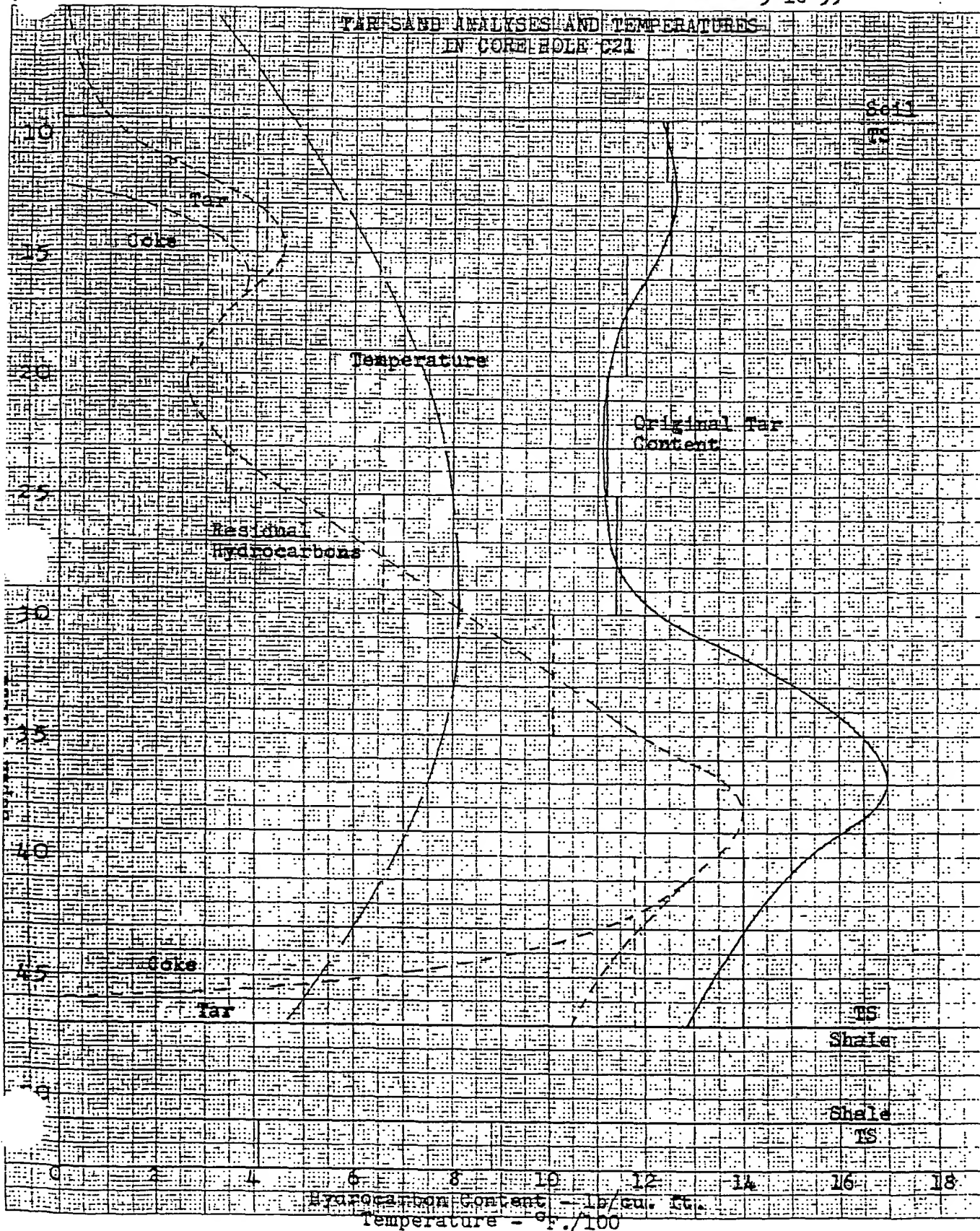


Figure 132

I9-215-22
5-18-59 RH

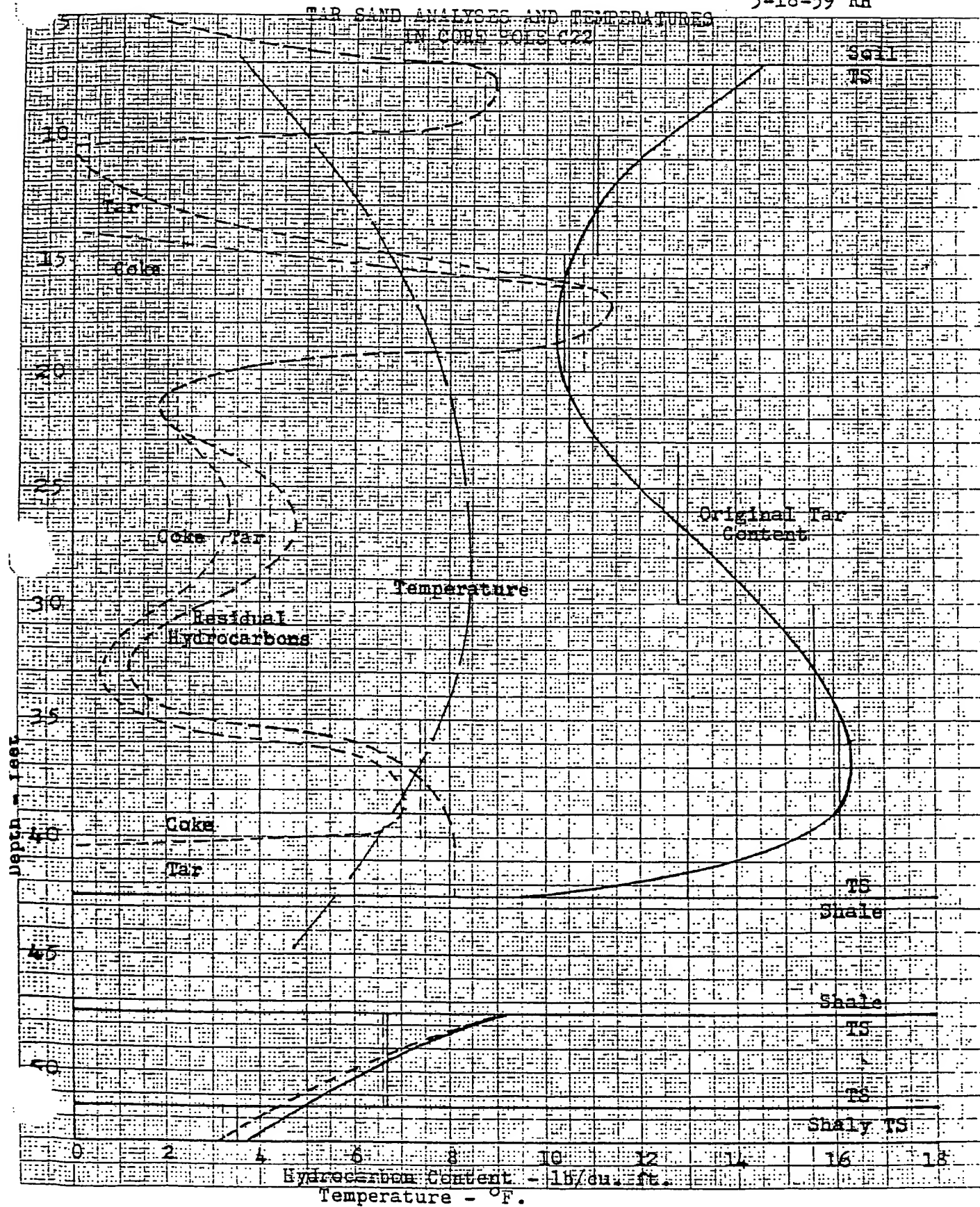


Figure 133

L9-215-23
5-18-59 RH

TAR SAND ANALYSES AND TEMPERATURES
IN CORE HOLE C23

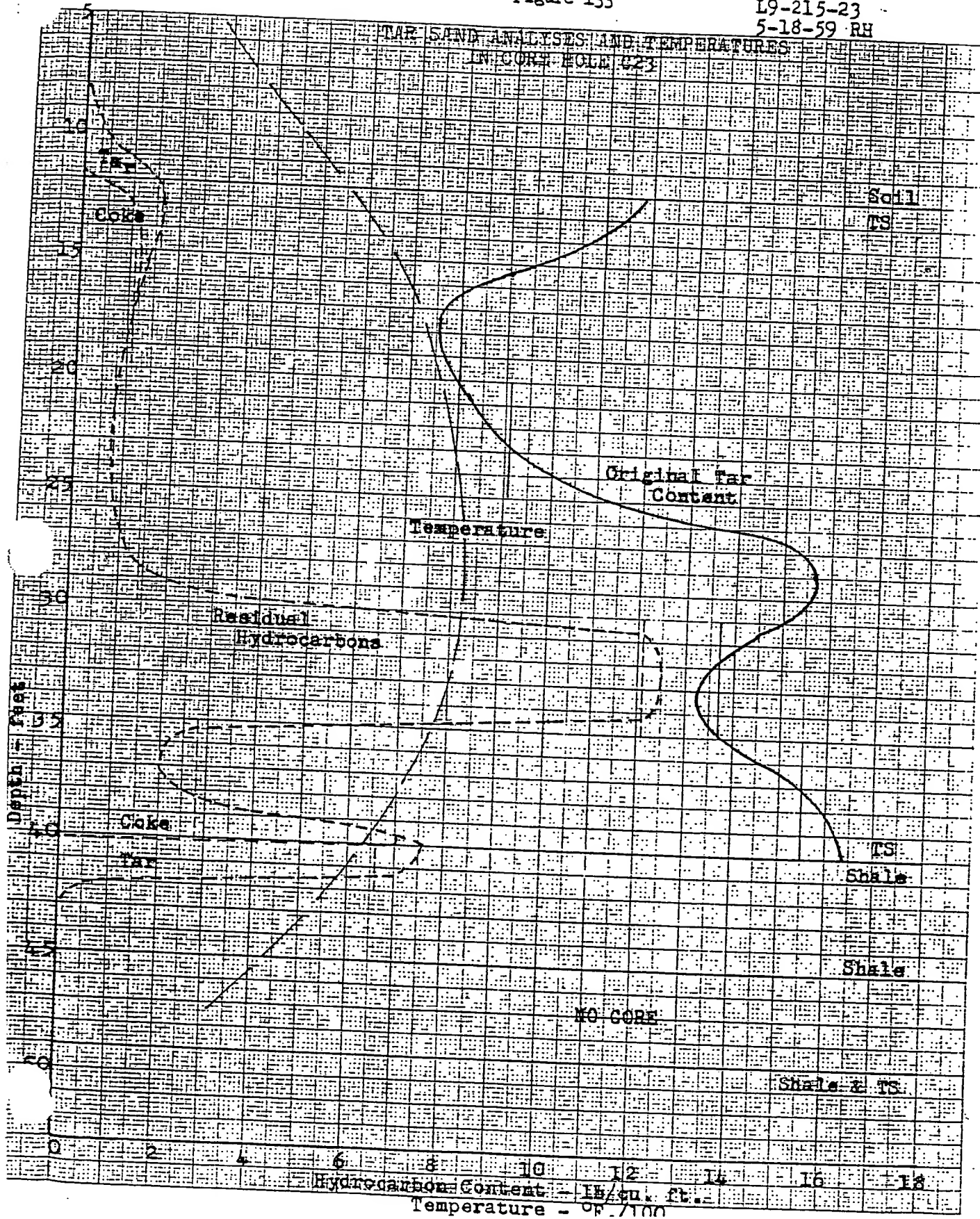
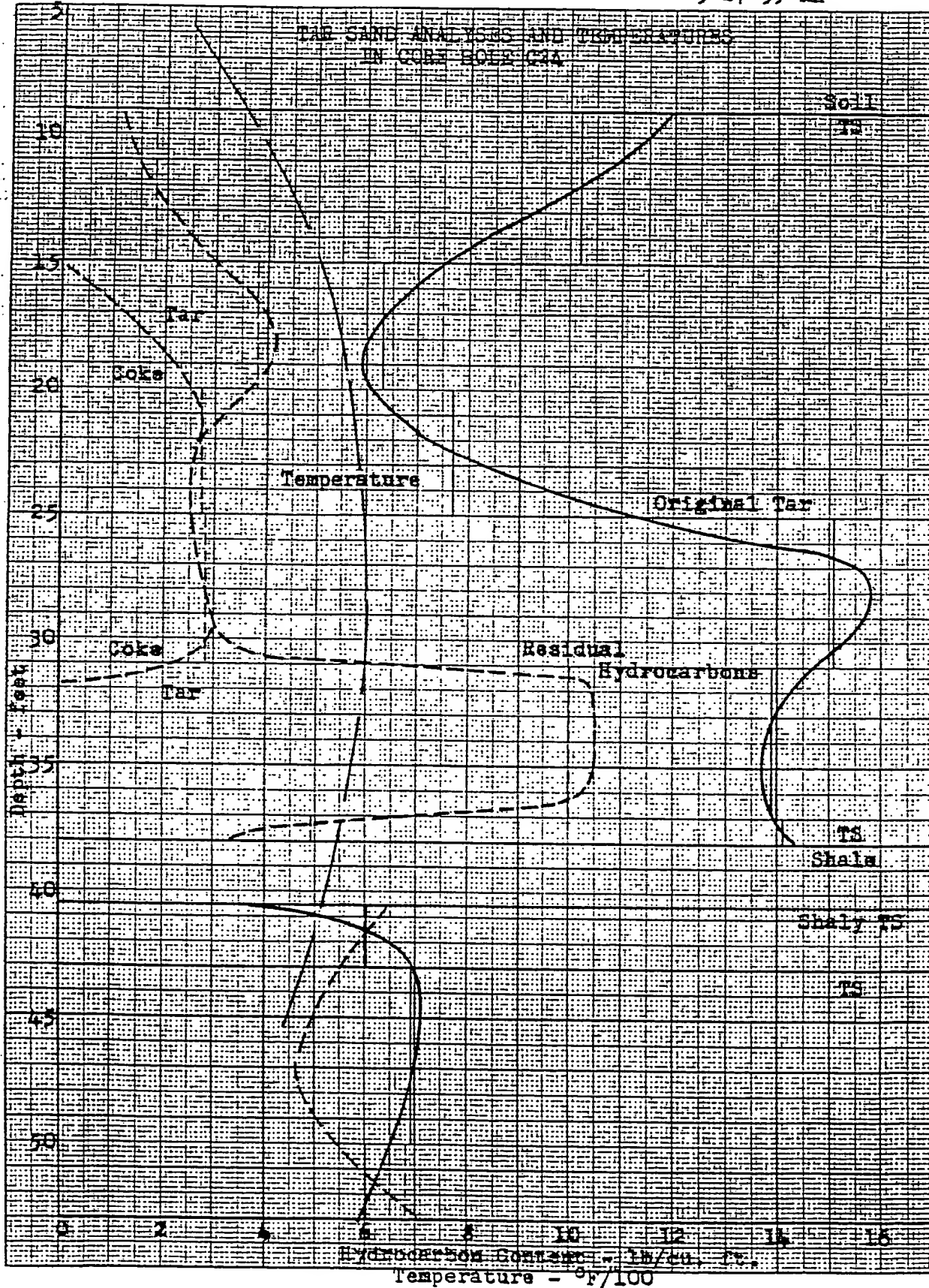


Figure 134

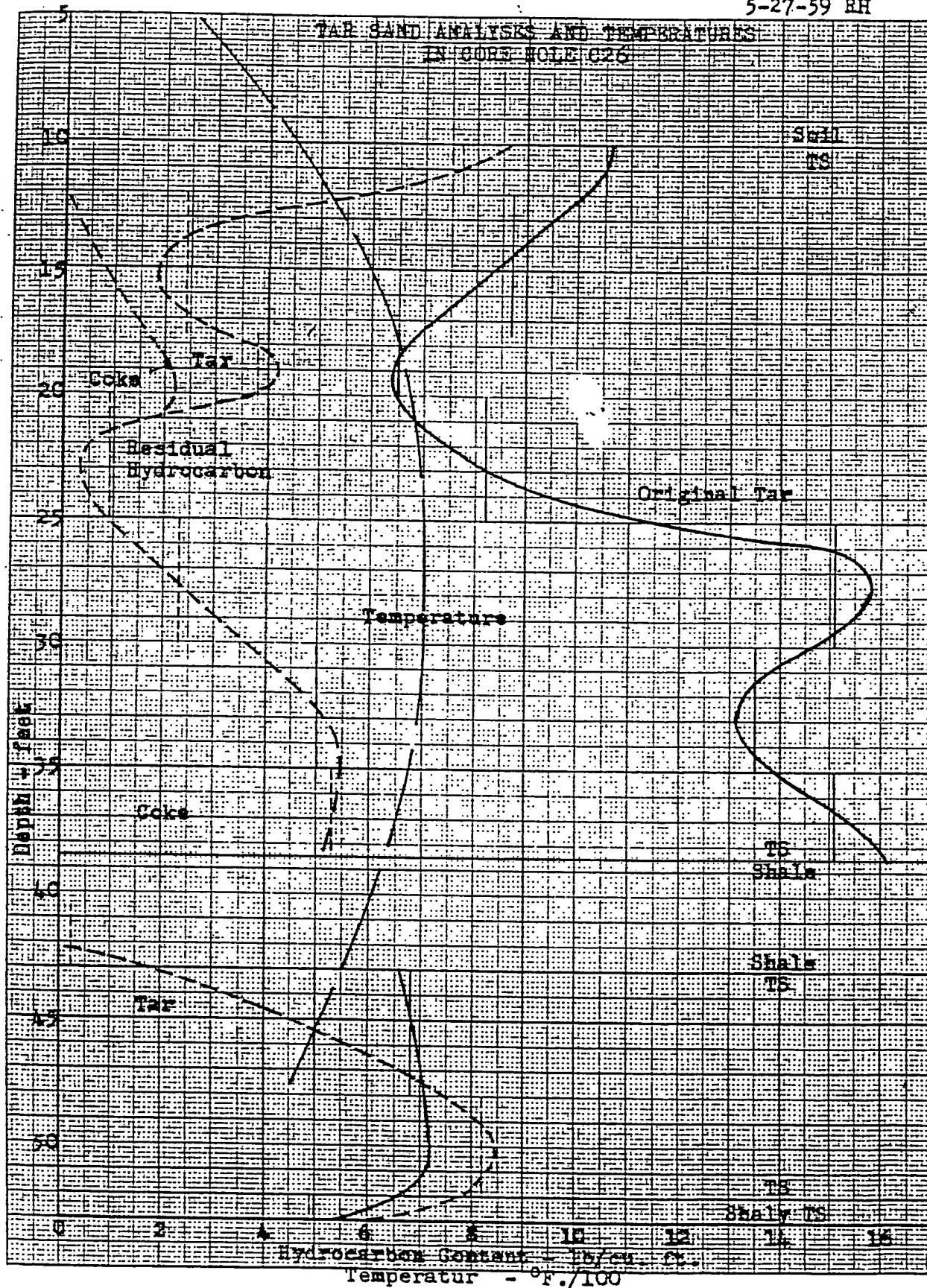
L9-215-24
5-27-59 RH



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Figure 135

L9-215-26
5-27-59 RH



PRINTED IN U. S. A.

MILLIMETER

Figure 136

L9-215-27
5-18-59 RH

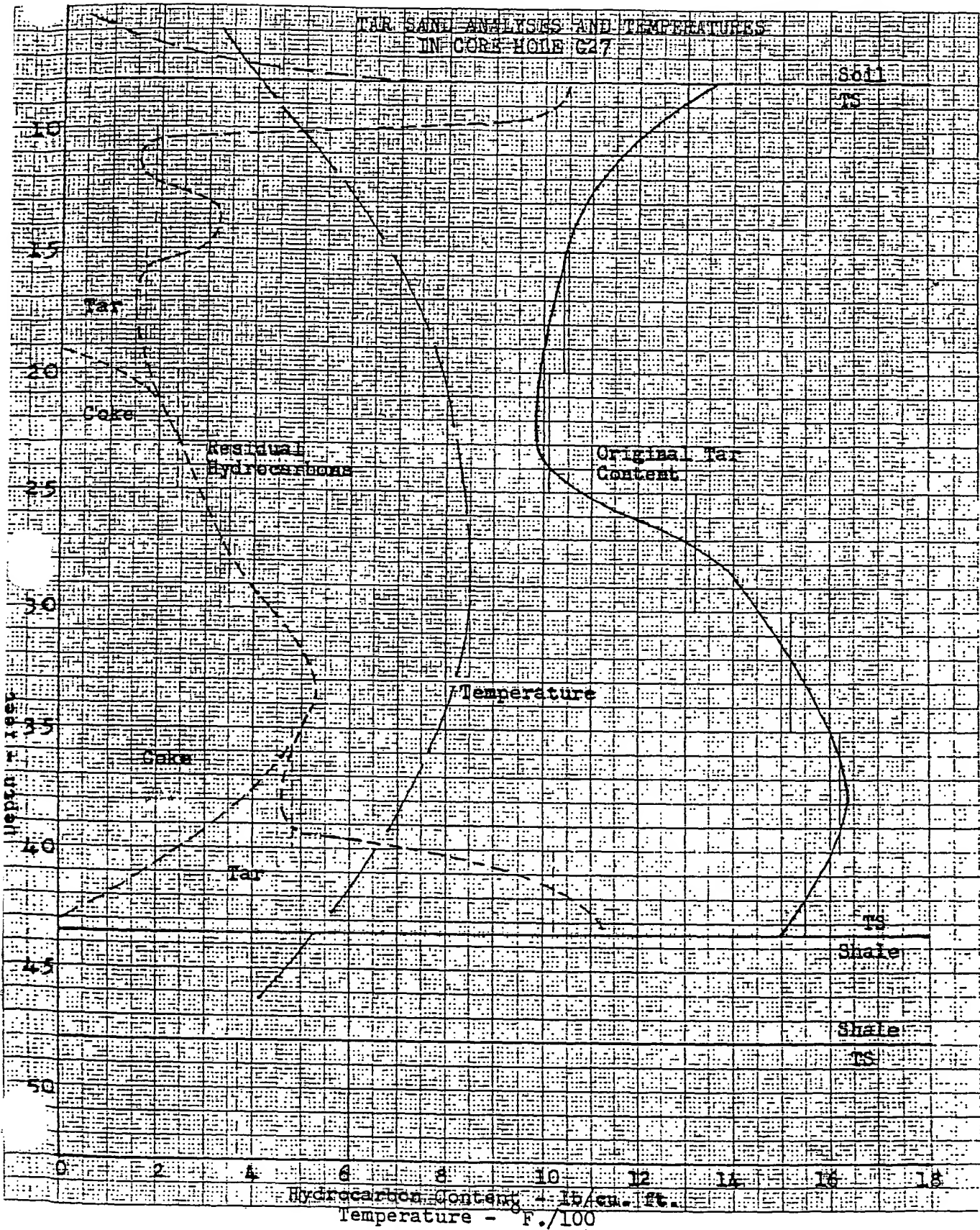


Figure 137

19-215-28
5-18-59 RH

TAR SAND ANALYSES AND TEMPERATURES
IN CORE HOLE C28

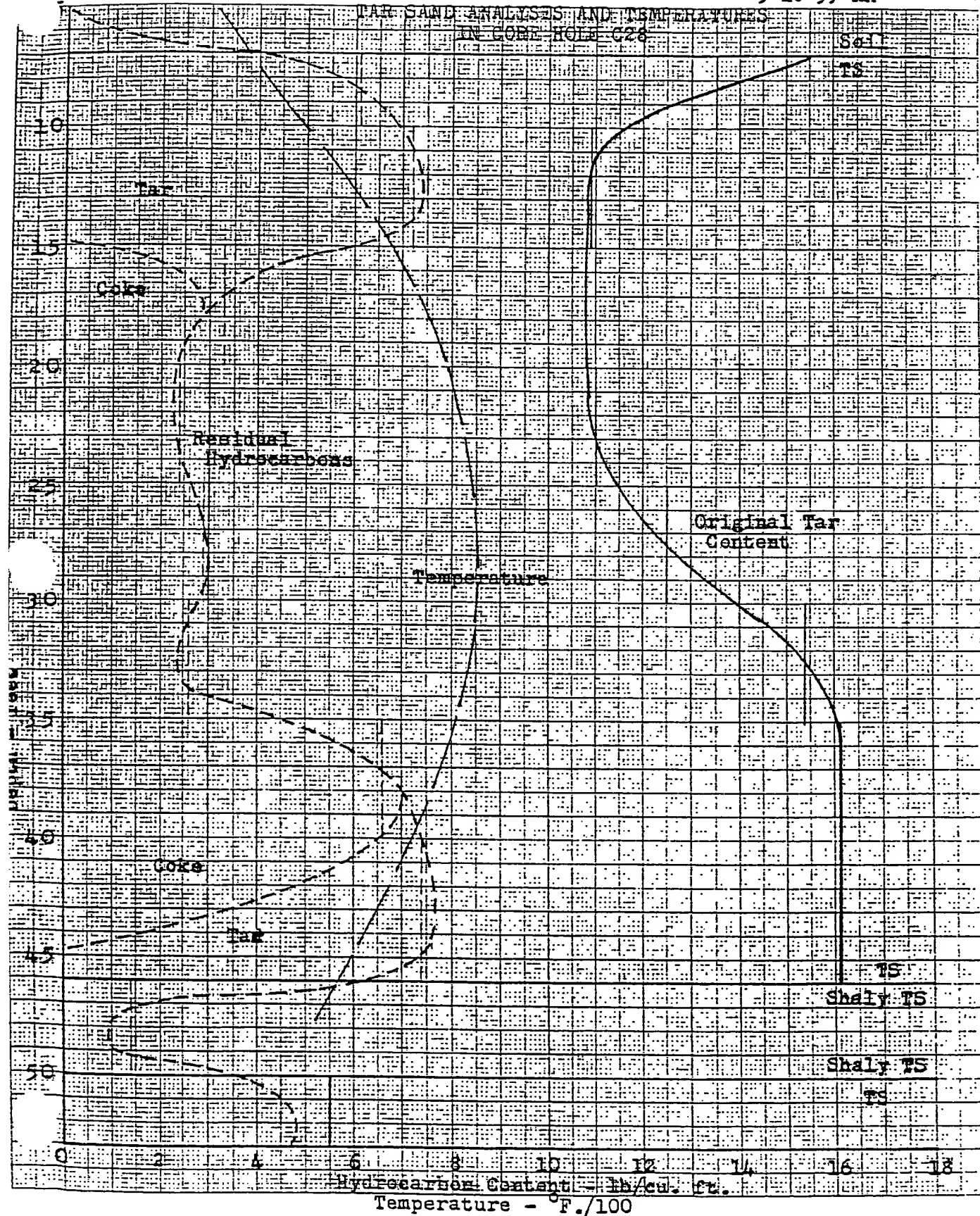


Figure 138

TAR SAND ANALYSES
AND TEMPERATURES
IN CORE LOG 29

19-215-29
5-18-59 RH

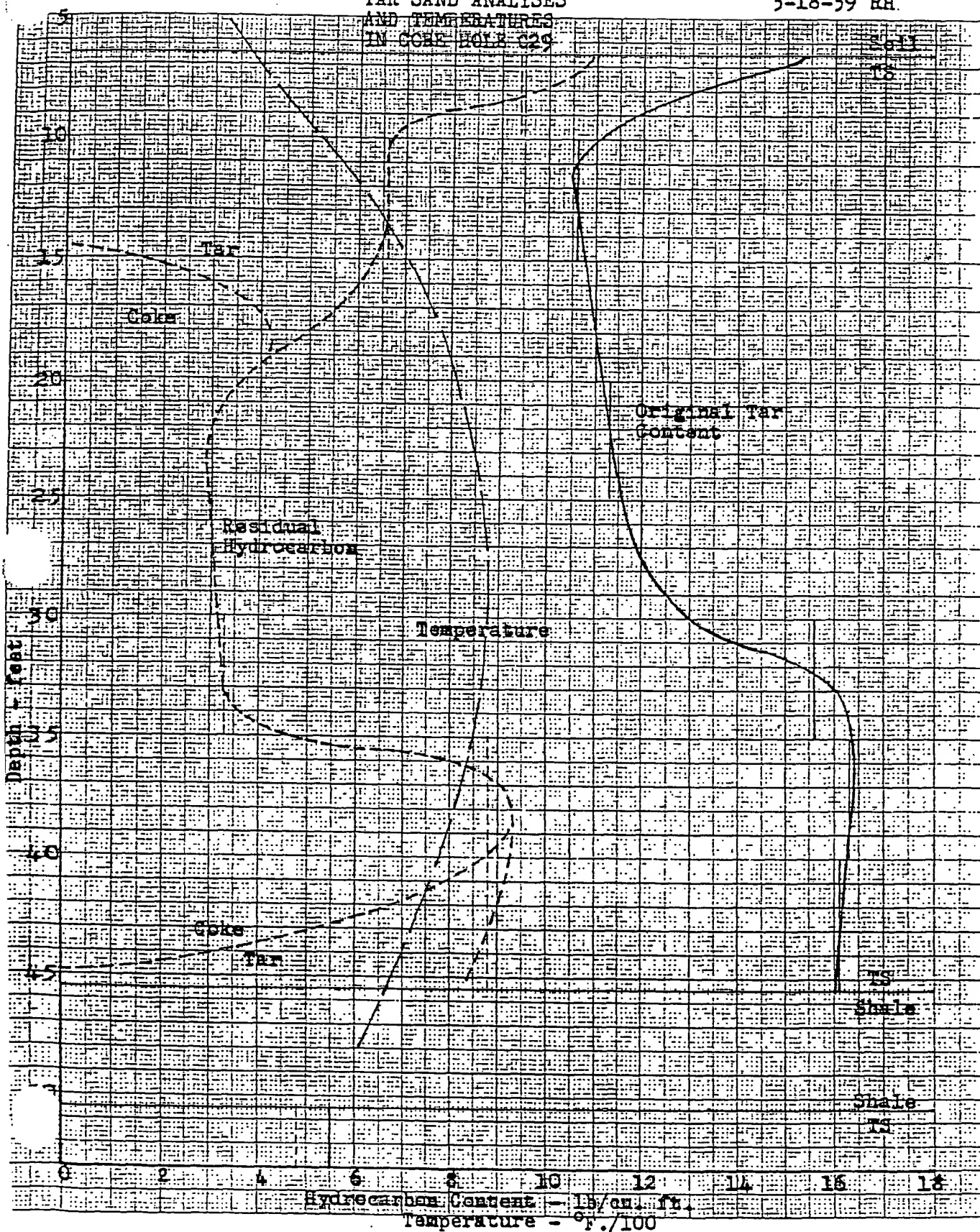


Figure 139

TAR SAND ANALYSES IN CORE HOLE C30

L9-215-30
5-18-59 RH

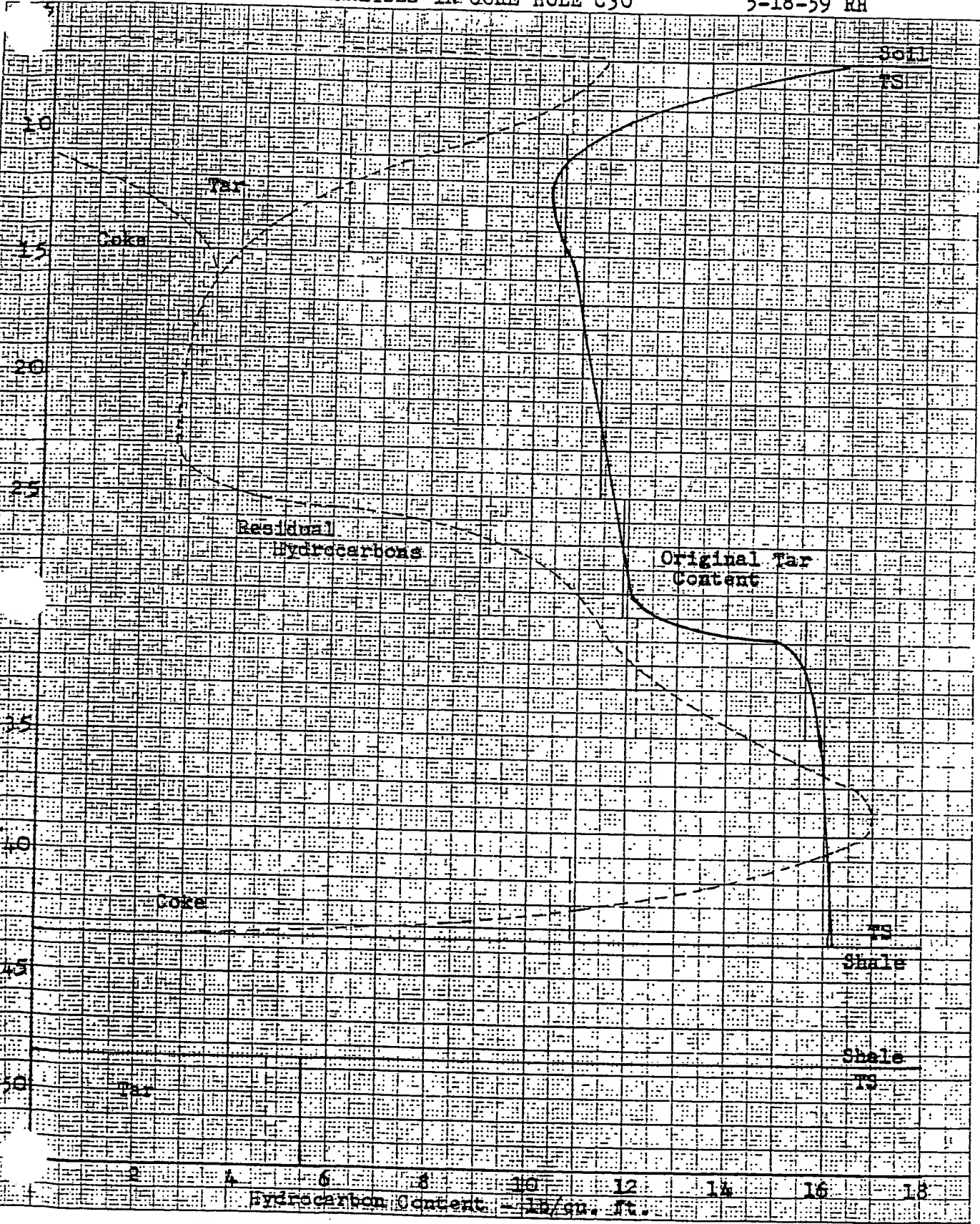


Figure 140

L9-215-31
5-18-59 RH

TAR SAND ANALYSES AND TEMPERATURES
IN CORE HOLE 1031

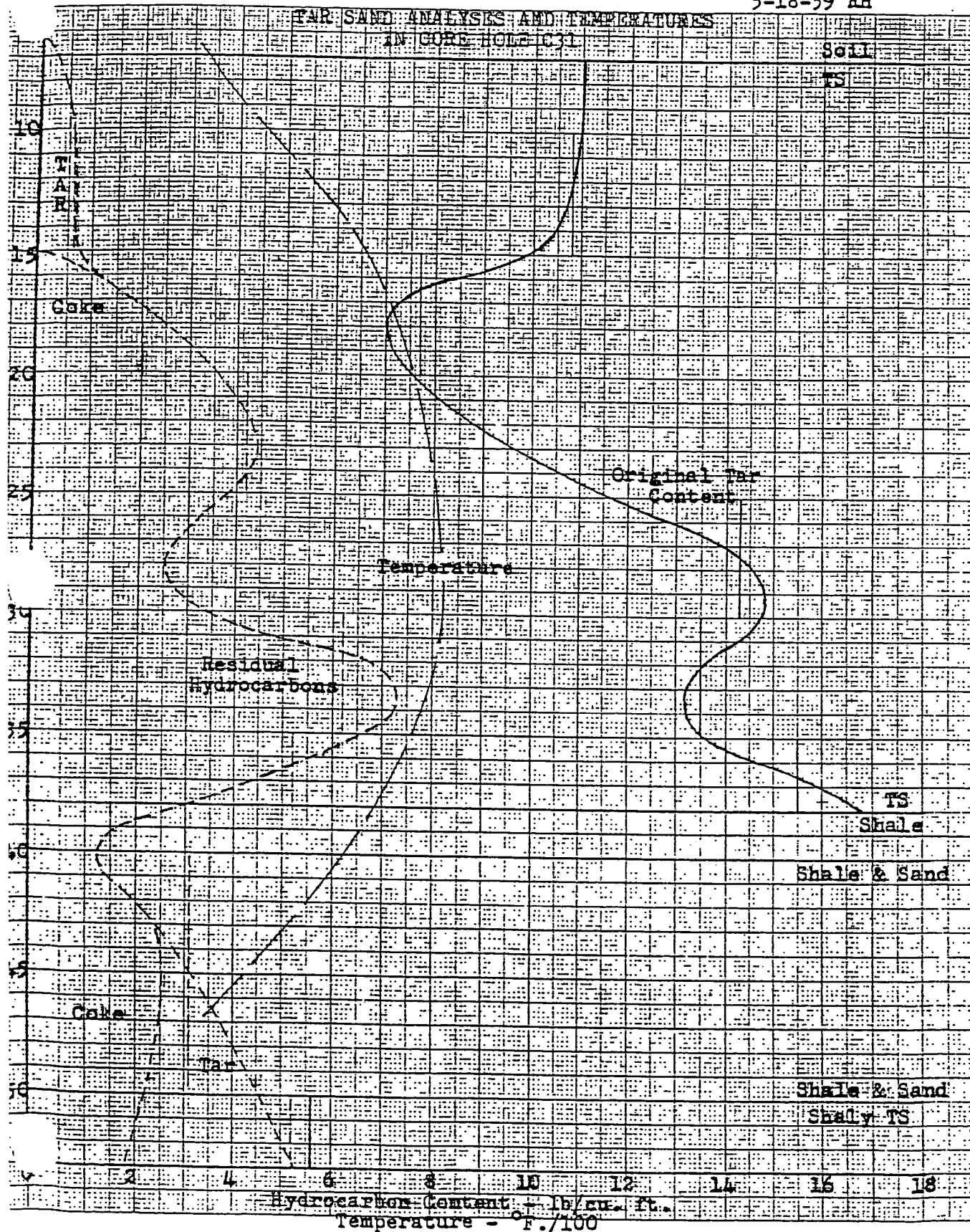
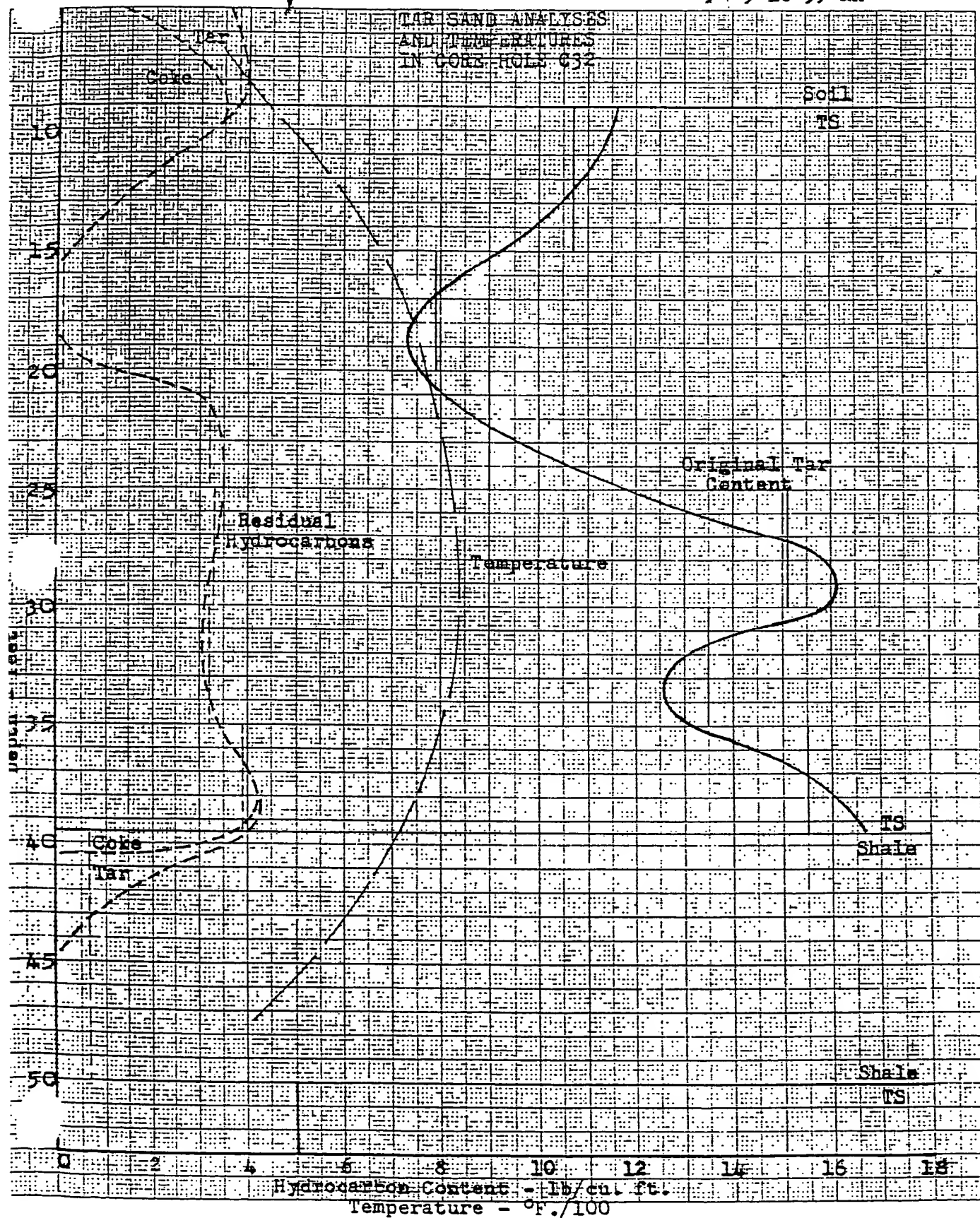


Figure 141

L9-215-32
5-18-59 RH



L9-215-33
5-18-59 RH

Figure 140

TAR SAND ANALYSES
AND TEMPERATURES
IN CORE HOLE 033

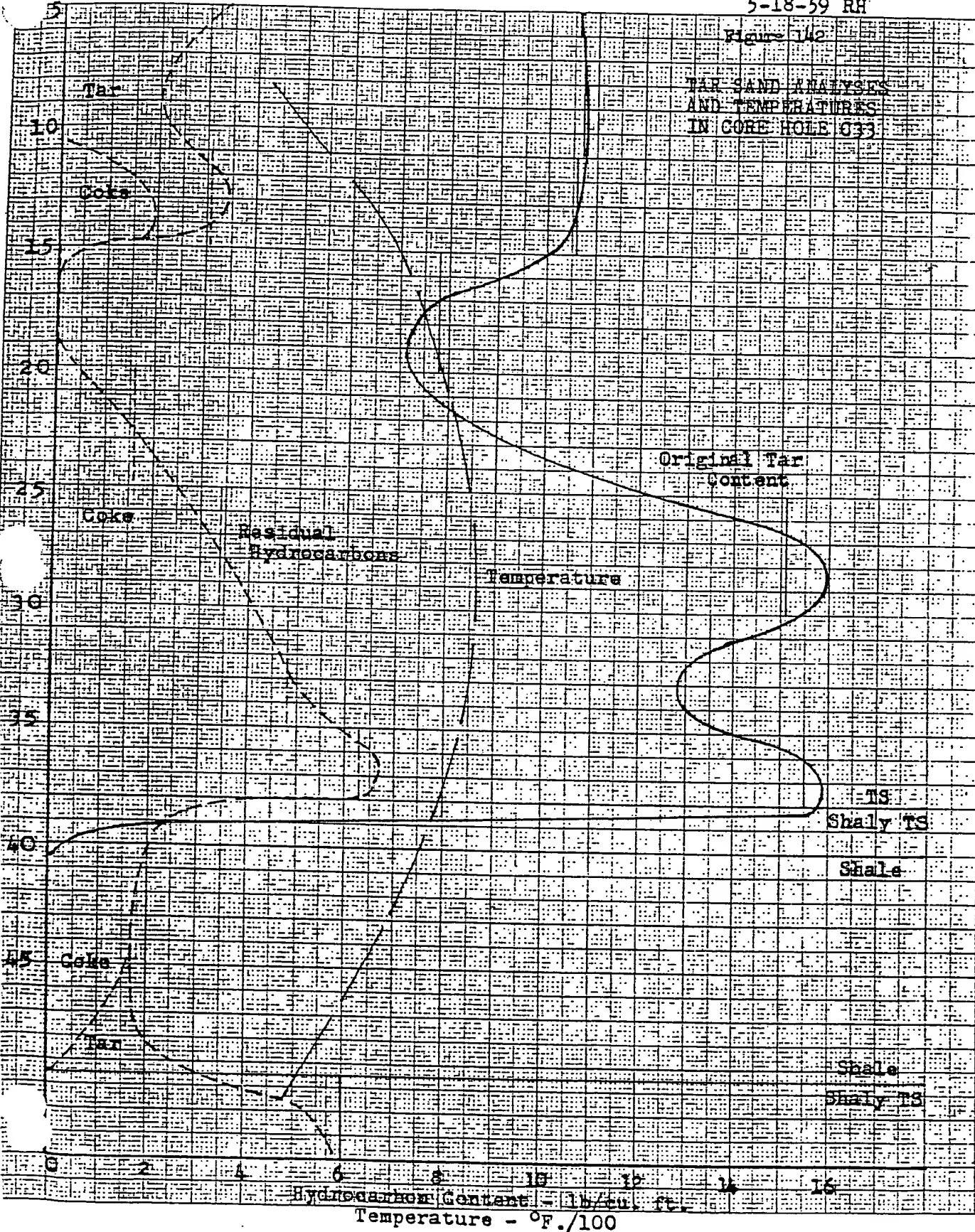


Figure 143

L9-215-34
5-19-59 RH

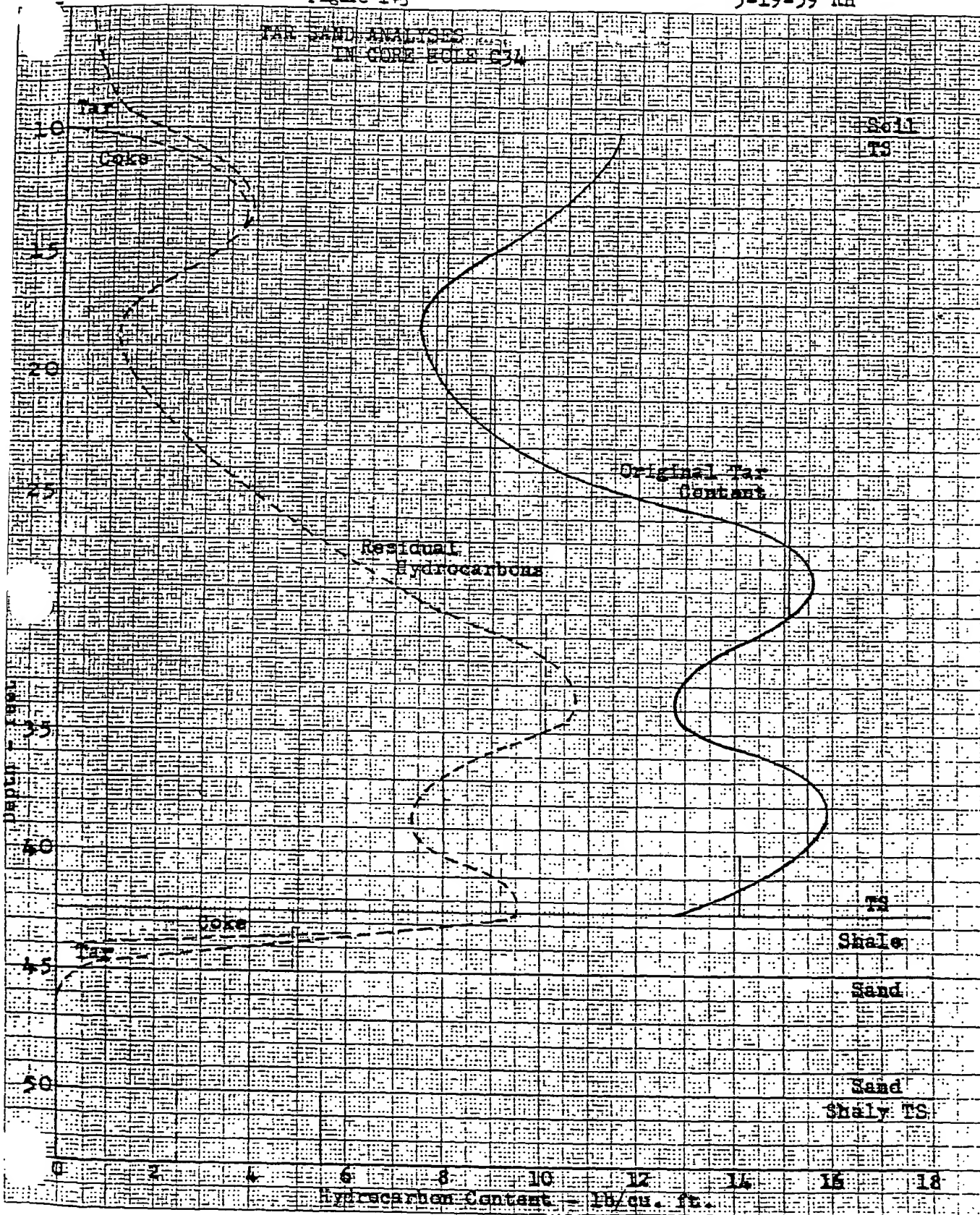


Figure 144

L9-215-35
5-27-59 RH

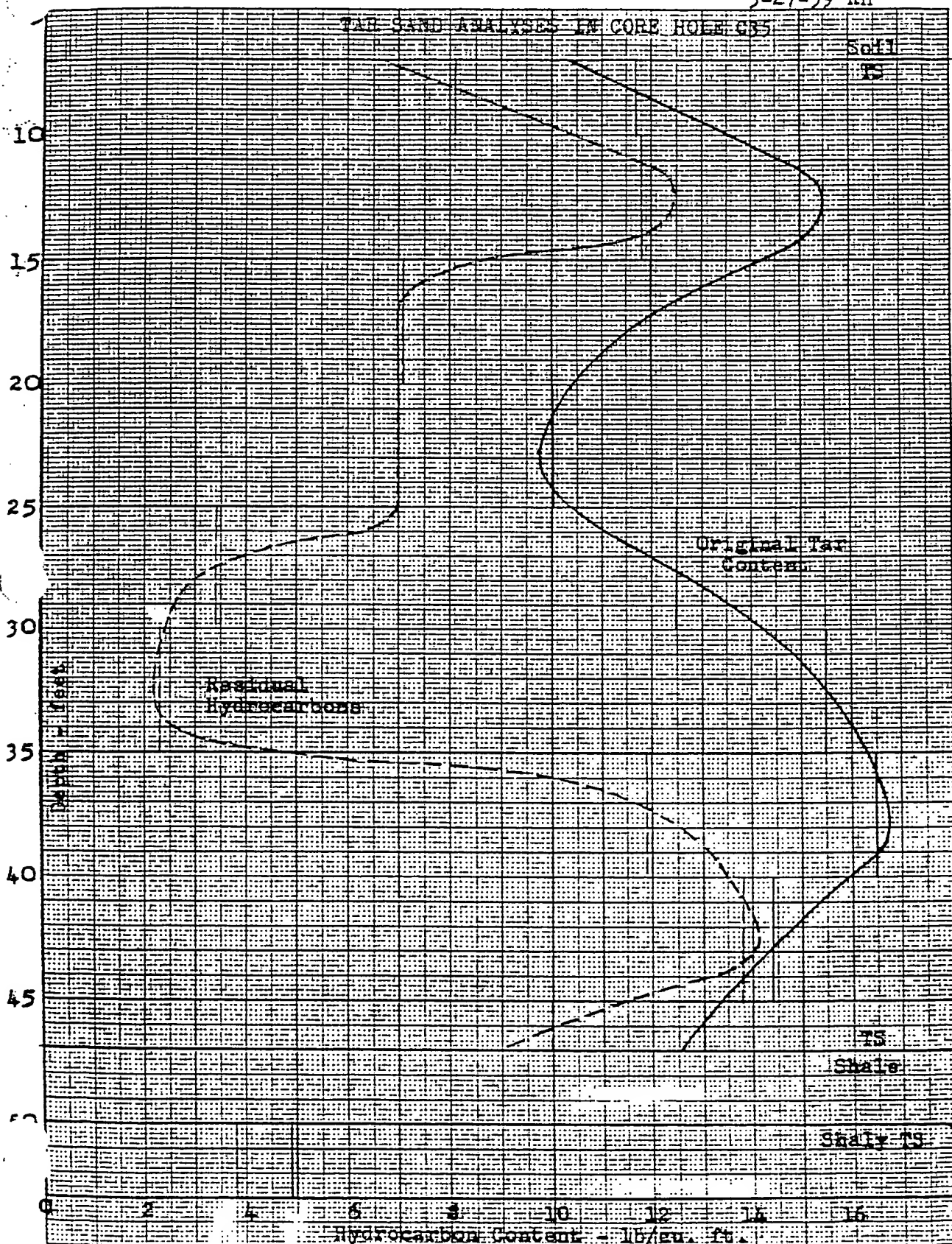


Figure 145

L9-216-1
5-18-59 RH

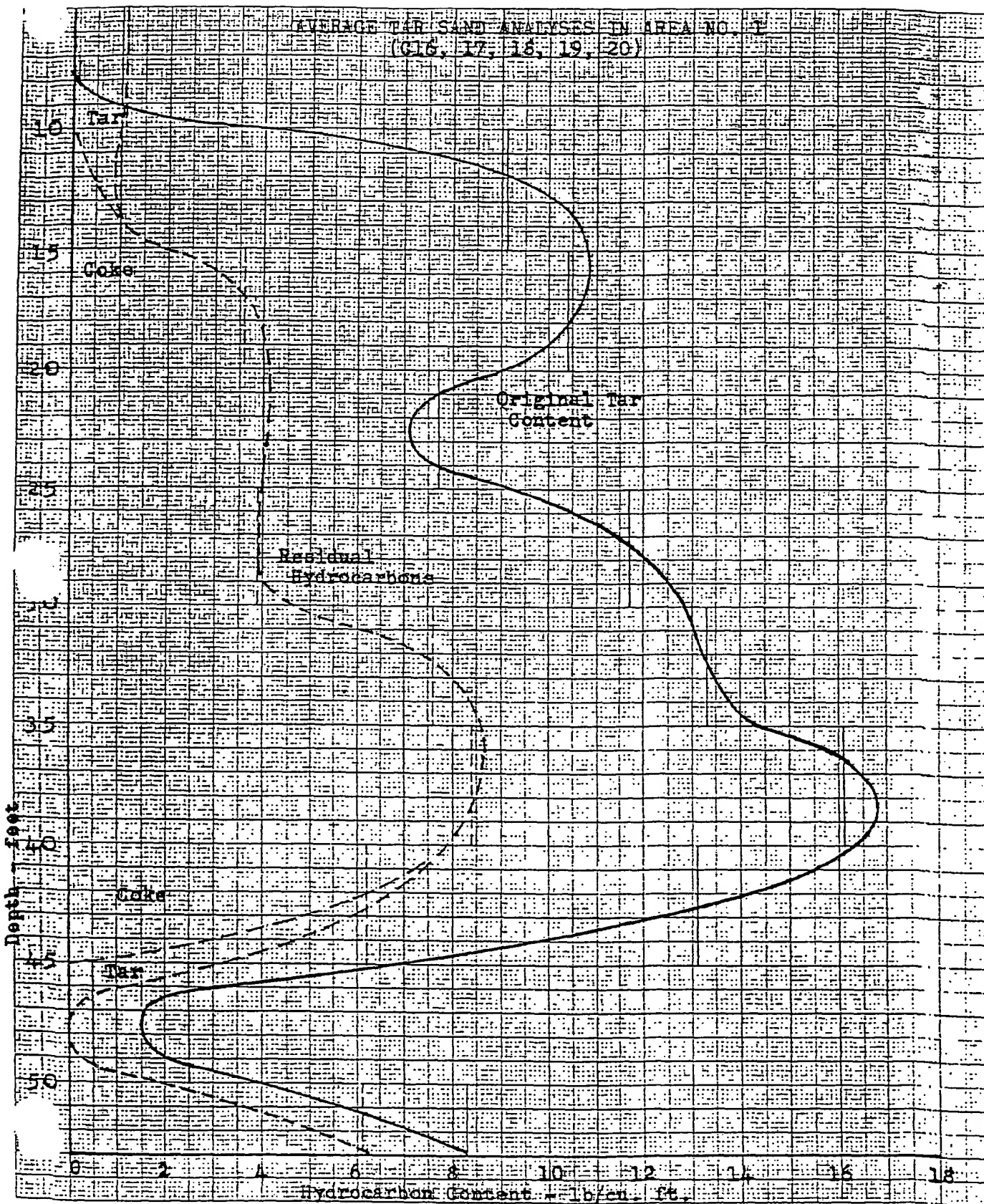


Figure 146

L9-216-2
5-18-59 RH

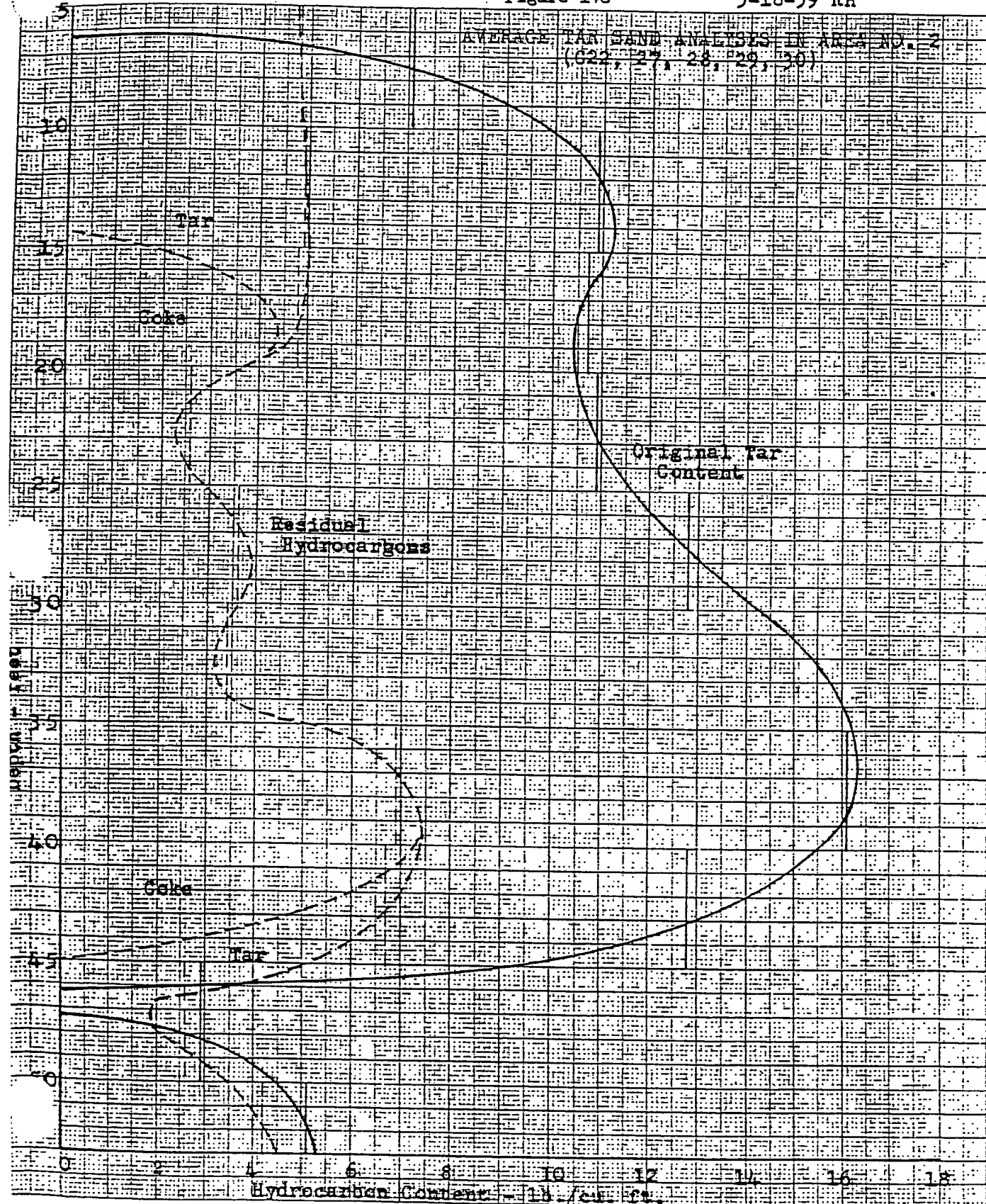


Figure 147

L9-216-3
5-18-59 RH

HYDROCARBON TAP SAND ANALYSES IN AREA NO. 1
(02, 31, 32, 33, 34)

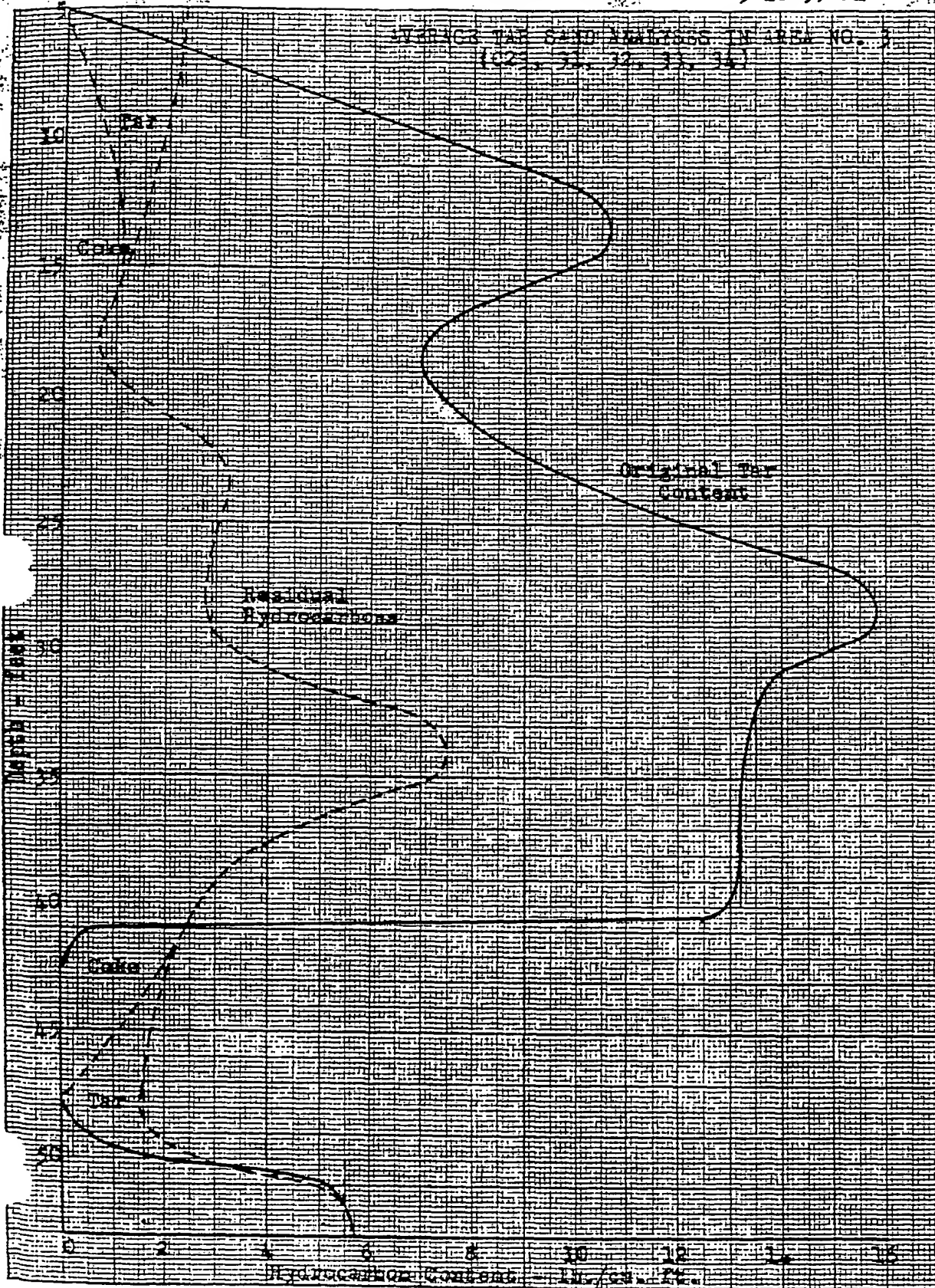


Figure 148

L9-703
5-14-59 RH

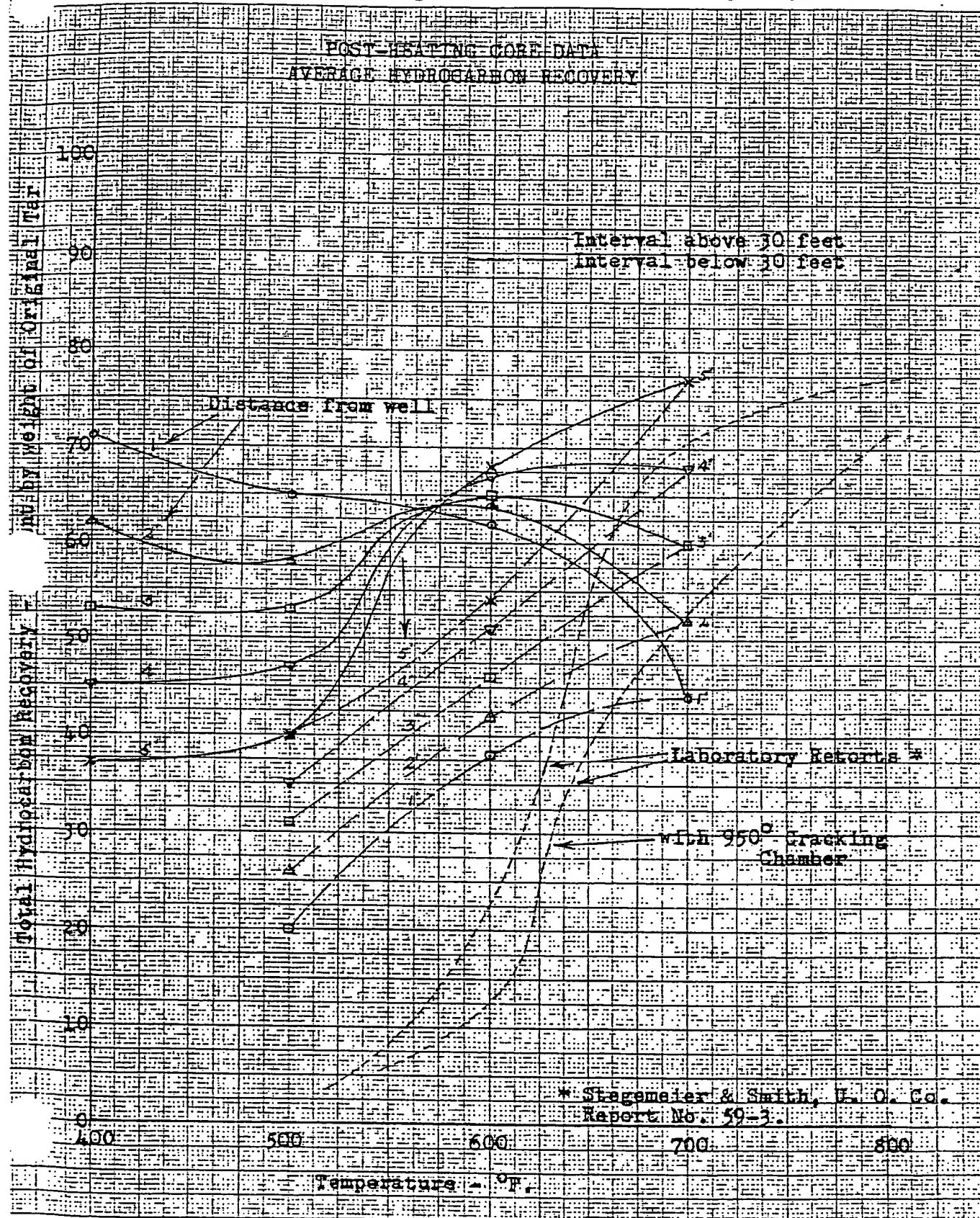


Figure 149

L9-704
5-14-59 RH

POST-HEATING CORE DATA

AVERAGE RESIDUAL HYDROCARBON CONTENT

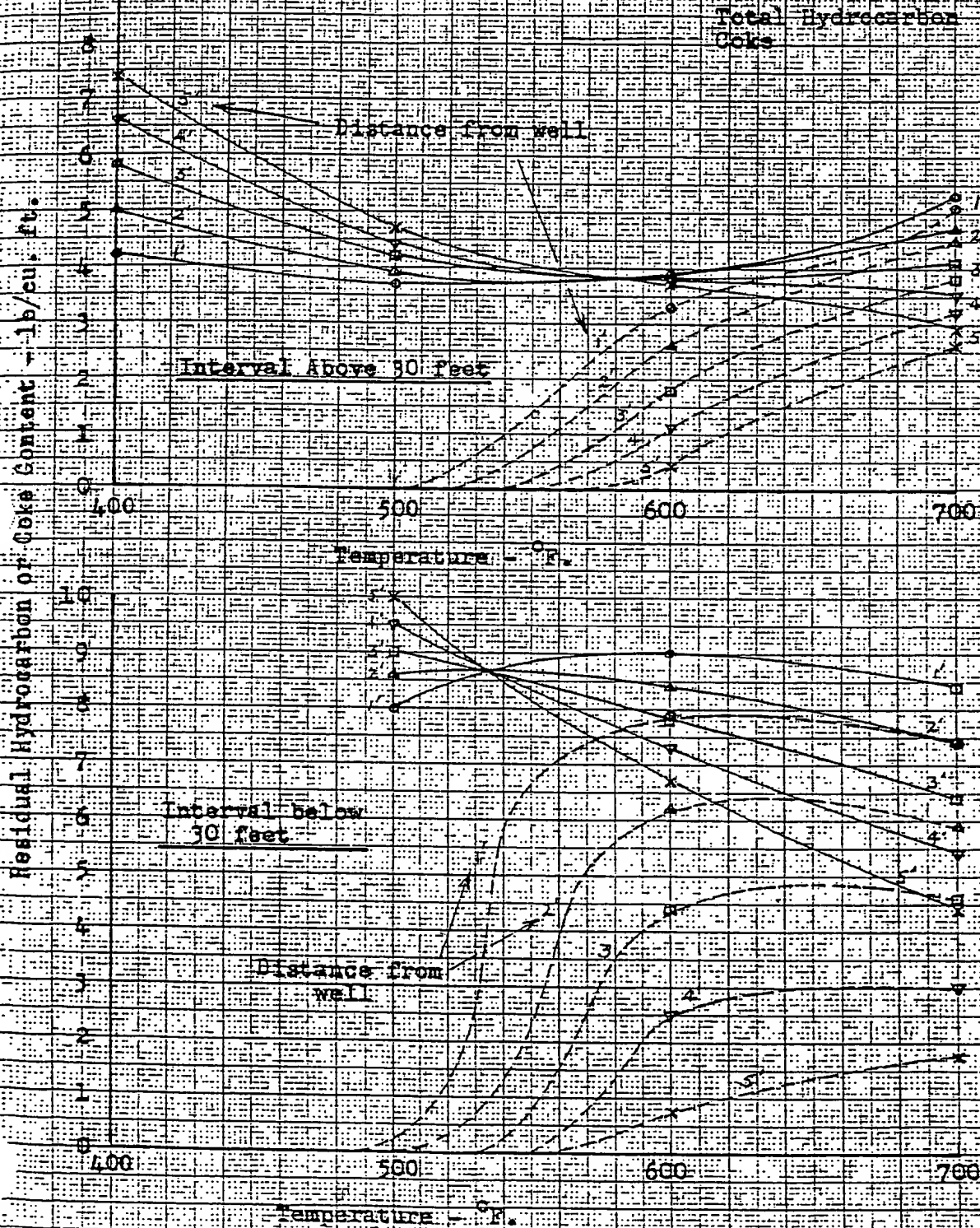


Figure 150

L9-707
5-15-59 RH

SEPERATE GAS WELL TEST IN 88-3

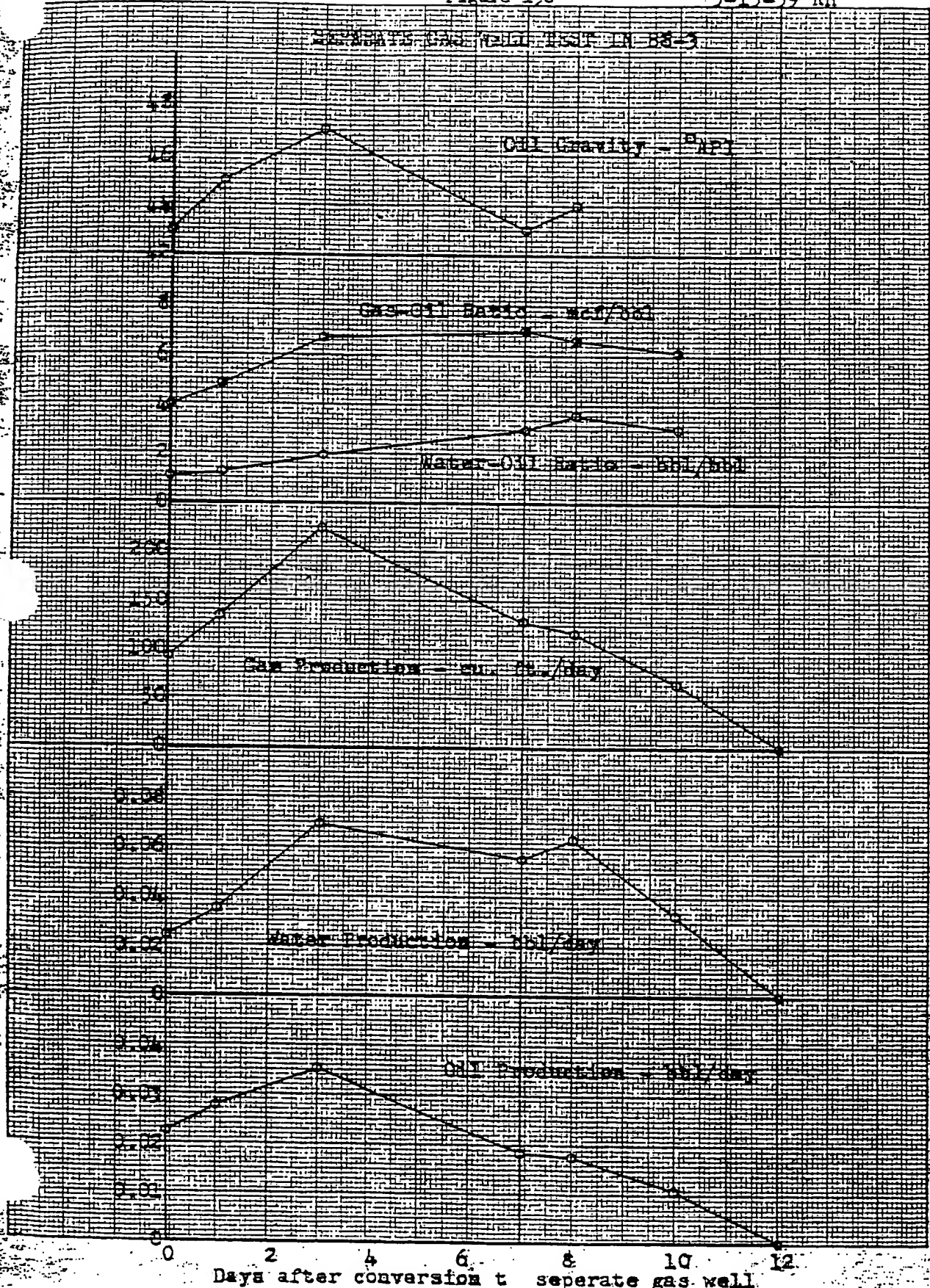


Figure 151

L9-443
5-25-59 RH

TEMPERATURES IN BS-3 BURNER CASING DURING
SEPARATE GAS WELL TEST

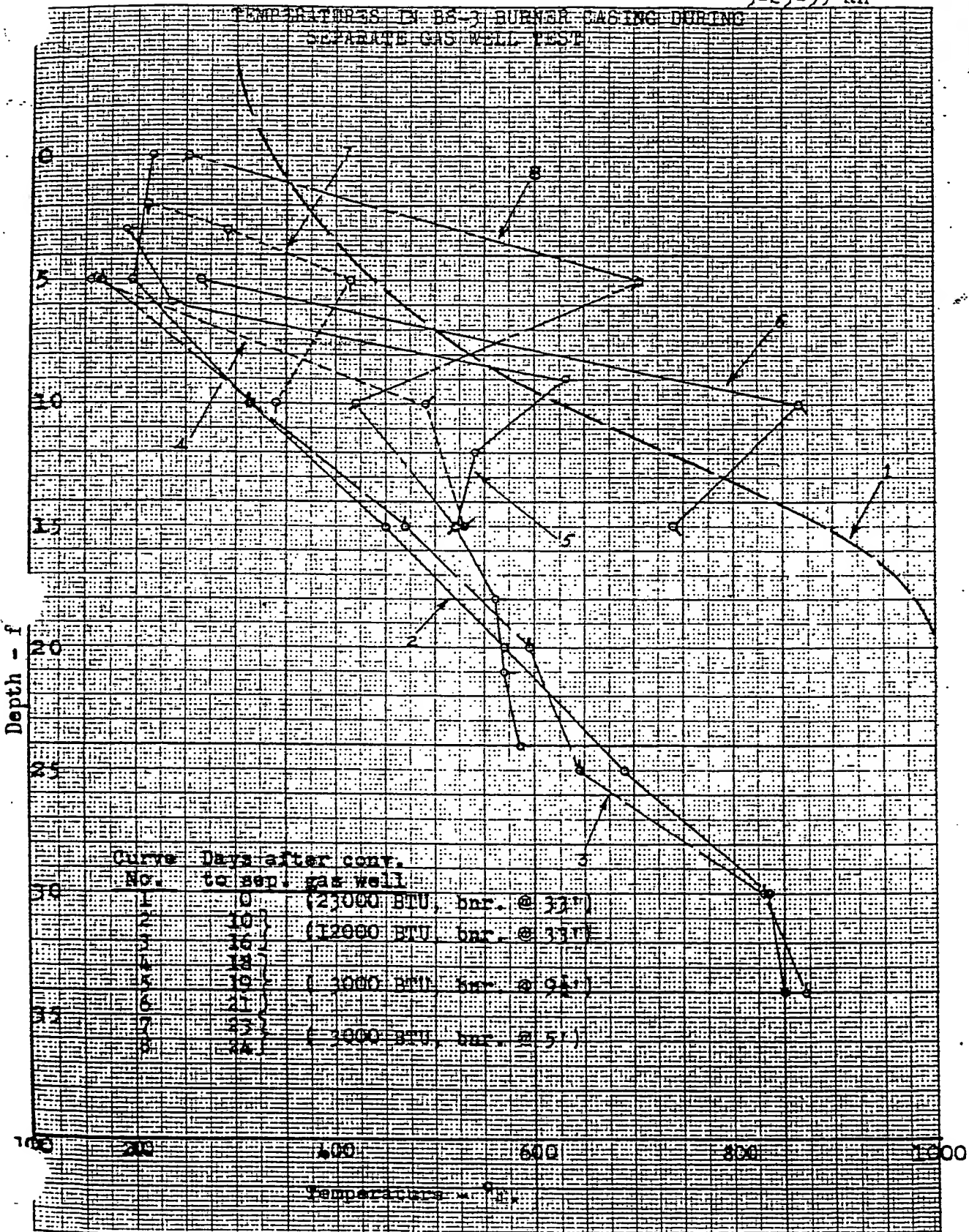
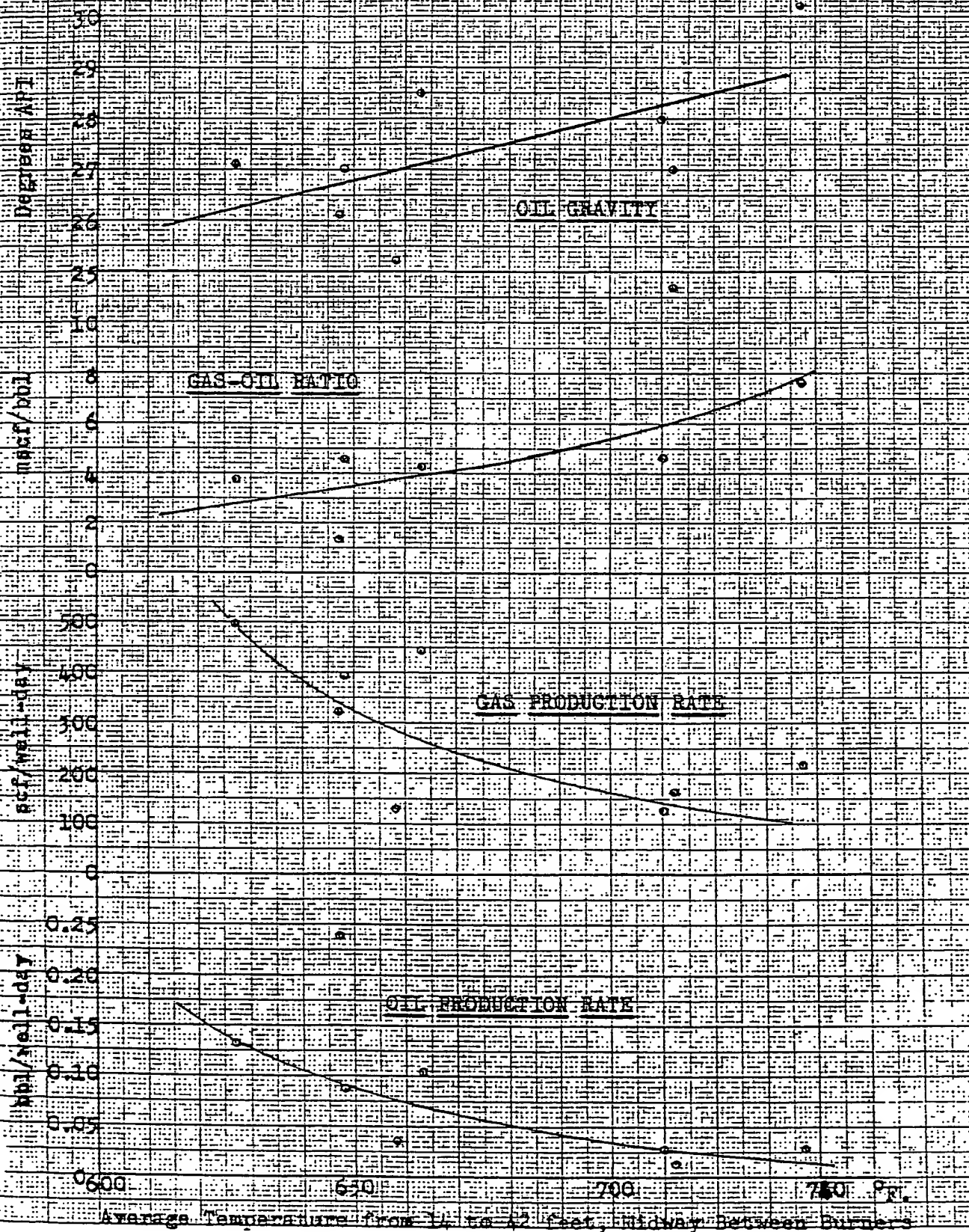


Figure 152

L9-706
5-14-59 RH

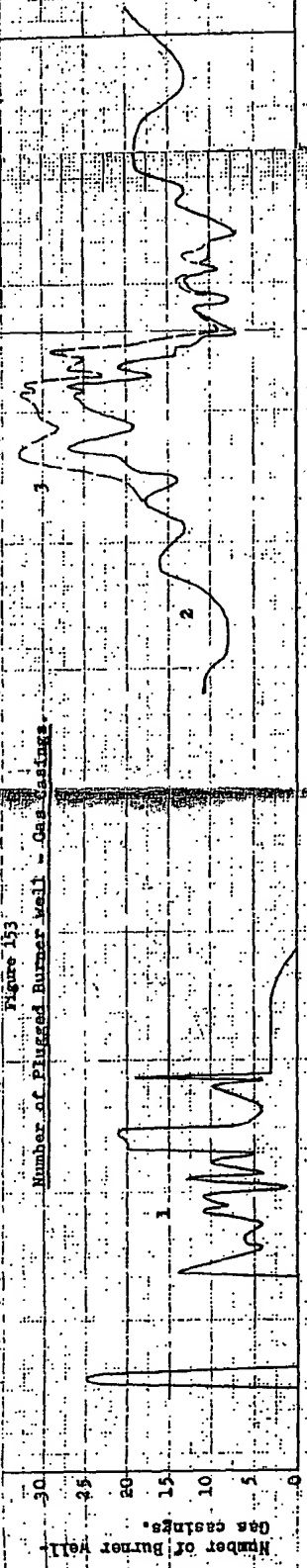
PRODUCTION TEST DATA

Inside Wells, Rows 3 to 8



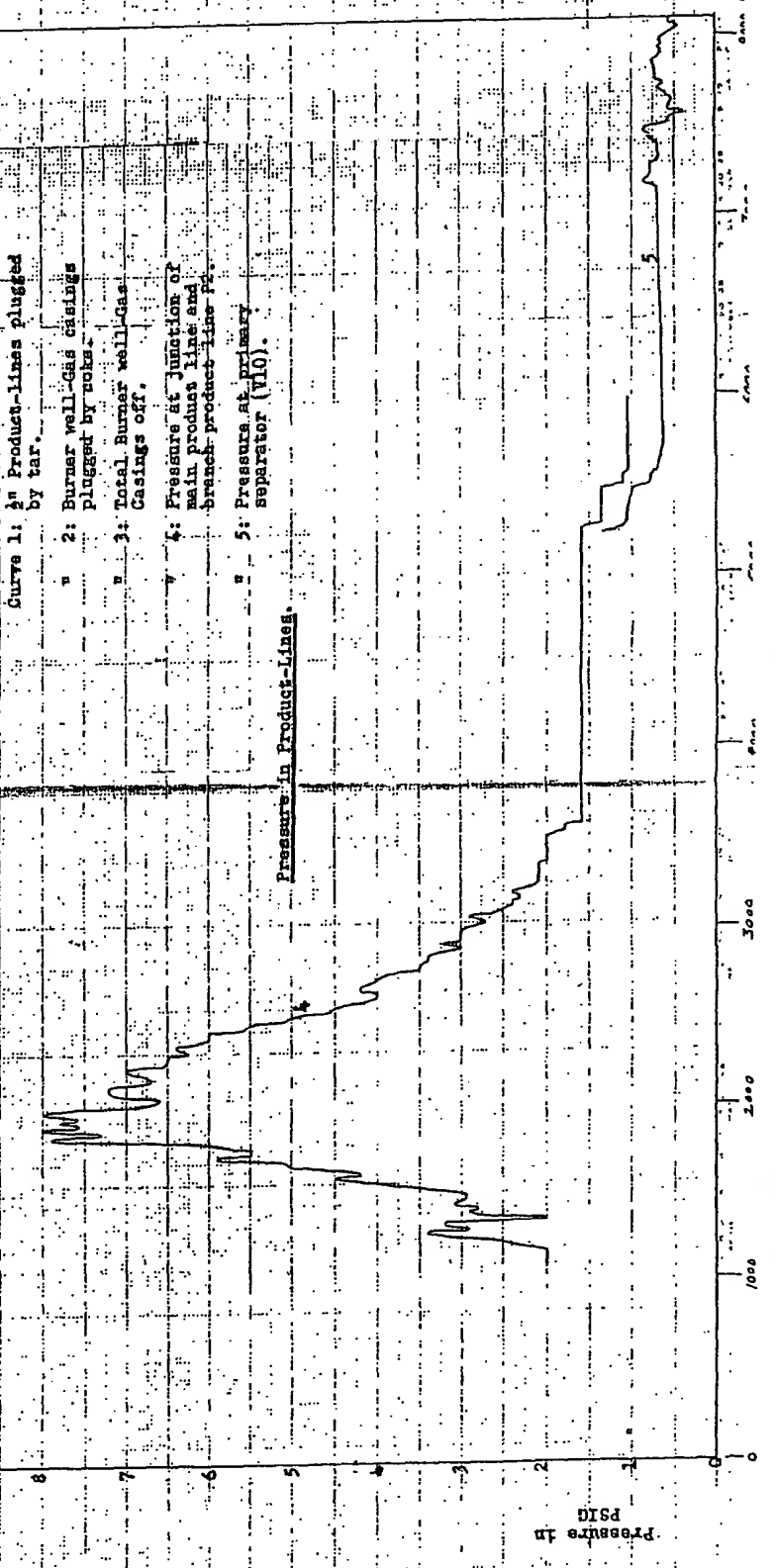
19-334.
4-16-59, BP.

Figure 153
Number of Plugged Burner Well - Gas Casings.



- Curves 1: 2" Product-lines plugged by tar.
- " 2: Burner well-Gas casings plugged by tar.
 - " 3: Total Burner well-Gas Casings off.
 - " 4: Pressure at junction of main product line and branch product line #2.
 - " 5: Pressure at primary separator (V10).

Pressure in Product-Lines.



| |
|---------------------|
| L 9-101... |
| JAN. 21 1958. BP |
| REVISED 3.15.58. AP |

-
- Technical drawing of a circular object, possibly a lens or a disk, with various markings and labels. The object is divided into several sections by concentric circles and radial lines. Labels include 'B-1-1' through 'B-1-10', 'T-1-1' through 'T-1-10', 'G-1-1' through 'G-1-10', and 'V-1-1' through 'V-1-10'. There are also handwritten notes at the bottom right: '10-30 D-10', '31-60', '61-90', and '91-120'.

HOLE PATTERN OF TEST L9

L9-101
JAN. 21, 1958. 8P
REVISED 3.15.58. AP

- BURNER. 15' 5 5/8" AND 40' 4 3/4" HOLE. 52' 2 1/2" CASING.
- CONCENTRIC GASWELL AROUND BURNER. 13' 4 3/8" - 4 22" CASING.
- SEPARATE GASWELL IN BURNERHOLE. 15' 1 1/2" CASING.
- 2' FROM ADJACENT BURNER. 20' 3 3/4" HOLE. 15' 1 1/2" CASING.
- 59' 2' 50' 3 3/4" HOLE FILLED WITH GRAVEL TO 15' 15' 1 1/2" CASING.
- 59' 2' 50' 3 3/4" HOLE FILLED WITH GRAVEL TO 15' 15' 1 1/2" CASING.
- CONCENTRIC GASWELL AROUND WATER VELL. 15' 4 3/8" - 4 22" CASING.
- WATER WELL 5' 9" FROM ADJ. BURNER. 55' 5 5/8" HOLE. 50' 1 1/2" TUBING. W56: 75' 5 5/8" HOLE. 40' 3 1/2" AND 10' 4" TUBING.
- TEMPERATURE VELL. 5' 9" FROM ADJACENT BURNER. 55' 3 3/4" HOLE. 52' 2" CASING.
- IN BURNERHOLE. 52' 1" CASING.
- 3' (T49B 4') FROM ADJACENT BURNER. 55' 3 3/4" HOLE. 52' 2" CASING.

